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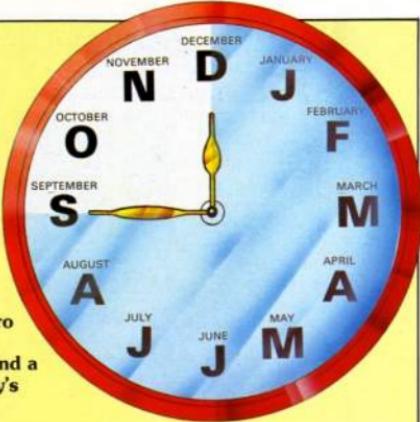
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Yes - it's bargain-hunting time again!

For BBC Micro and Electron users this is the start of the top buying period of the year - the time when they stock up with all the latest hardware and software that will enhance the versatility, power - and just sheer fun! - of their micros.

And the ideal time to hold the Electron & BBC Micro User Show, where they get the best of both worlds - a first look at all the fascinating new-season products, and a chance to pick up really worthwhile bargains as yesterday's top sellers are sold at rock-bottom prices!



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electron NEWS

user

£250 prize challenge for gamers

CHART-TOPPING game Thrust has been released for the Electron by Superior Software.

Part of the promotion is £250 in cash prizes – £200 for the winner – for the first to complete all 24 screens of the game.

Sales manager Ken Campbell said: "Never before have I experienced such excitement for an Electron game. We have had our fair share of chart hits but this one seems to beat the lot".

Managing director Richard Hanson, said: "The launch of Thrust marks the start of a series of major releases from the company".

The dual cassette costs £7.95.

A heart searcher

IN Imagine's new game for the Electron, Mikie, the player faces a load of heart searching.

The game is set in an American school with Mikie combating obstructions while searching for hearts hidden in various departments.

With each heart there is a letter, and when all are collected they form a sentence for him to open a secret door which eventually leads to his girl friend.

The cassette costs £8.95 and the disc £12.95.

BBC Micro power for the Electron?

A DRAMATIC increase in the overall performance of the Electron has been achieved as a result of two technological breakthroughs in the last six months.

So much so that independent experts are now claiming that the two add-ons combined make the machine "as compatible as possible" with the BBC Micro and the Master series.

Yet the cost of the complete package –

including the Electron itself – would still be less than £230.

Known as the AP4 and the AP5, both peripherals come from Advanced Computer Products, the Yorkshire-based development company.

First to be launched was the AP4, a disc interface which opened up the Electron to a vast pool of software previously restricted to the BBC Micro. It features 1770 DFS as

standard running with page at £600 and costs £69.95.

Now ACP has informed *Electron User* that it is soon to unveil the AP5 which will effectively add three more interfaces to the machine.

It combines a 1 MHz bus, user port providing the same I/O as the BBC Micro and a Tube interface, and is likely to cost in the region of £60.

The user port will allow the Electron to

control external devices such as robots, although special software will need to be written in each case.

ACP has already made AP5 capable of running the critically acclaimed AMX Mouse and its accompanying computer aided drawing package AMX Art.

The Tube interface will allow Acorn's second processor to be connected to the Electron for the first time.

This will provide a major boost in speed for the machine, in theory making it as fast as the BBC Micro.

60k extra

It will also create additional memory – some 40K of usable RAM in Basic and more than 60K for machine code.

"All this is part of our policy of reinforcing the Electron's position in the market", said John Hudlestons of ACP.

"And it seems to be working. Since we launched the AP4 we have in fact had to quadruple production.

"So there are obviously a lot of people out there wanting to make the most out of their machines".



TELEVISION star Fred Harris's love affair with the Electron continues. The former teacher who went on to become a household name in such programmes as *Me and My Micro* and *Micro Live* has recently bought his second Electron. "It's a very underrated and highly capable machine," he told *Electron User*.

ELECTRON TO STAR AT SEPTEMBER SHOW

A SURVEY among the first 20 exhibitors to book for the September Electron and BBC Micro Show has revealed they expect the Electron to be the main draw at the event.

Fifteen of the stand-holders reported that their overriding reason for attending was to capitalise on the booming Electron market.

One supplier, Advanced Computer Products, even pencilled in its booking a year ago to obtain a prime site at the show, which is being held at UMIST, Manchester, from September 26 to 28.

The swift reaction for bookings comes after the success of the Electron at the Spring show in London when 16,000 visitors, over three days, produced records sales of £1,200,000.

At the Spring show the first day alone saw more than 5,000 enthusiasts converge on the exhibition - the largest number ever

during a weekday.

Database Exhibitions' head Derek Meakin said: "The continuing and increasing enthusiasm for the Electron is reflected by the keenness of the companies with their early bookings".

He added: "This is the only event in the North of England this year that will cater exclusively for the Electron and BBC Micro users. Judging by the advance bookings previous records will be broken".

At LCI, Eve Ludinski revealed that the Manchester show will be the launching pad for LCI's new release for the Electron, Brain Teasers, an educational set of 24 programs catering for all ages.

"The Spring show was such a success I was quick to book for Manchester. Our new educational software will cost £24, but there will be a £5 reduction at the show.

"I expect the

response to be just as fantastic as the last show", Eve added.

Nick Pearson of Advanced Memory Systems said: "We will have new products on show, including Mouse Mat, Mind Games, Zap Zone and Desktop".

One leading supplier to the Electron market said: "The last Spring show in London was such a success that I left my stand to go and book a spot for the Manchester event".

A spokesman for

Advanced Computer Products said: "We, like many others, will have special show prices.

"Even though it was a year ago when we asked for a stand at Manchester we already had plans for some exciting new products for the Electron. We wanted to be in early to ensure a good launch".

The survey showed there will be some 130 special show price offers, which by the time of the show should grow to more than 540.

Match-making micros

AN Electron has been brought in to play Cupid in the Midlands with some remarkable results.

The machine is being used as the nerve centre of a dating agency on the outskirts of Birmingham known as Elect-A-Friend.

It is called on to monitor details of people on the agency's books in the hope of achieving the perfect match.

Successful

So successful has the Electron in question been over the last 12 months that nine of the couples it has introduced are planning to marry.

"In the whole of the two years we were in operation before we introduced the computer we only recorded one engagement and that was broken off", said Joyce Jones of Elect-A-Friend.

"Now we can't go wrong. It's hearts and flowers all the way".

Irritates

The Electron considers details of age, height, weight, colouring, drinking and smoking habits, pastimes and even what irritates a person most about the opposite sex.

It then cross matches the data and makes the selection of the most likely mate.

To date the Electron has only one real failure on its hands - the young man who programmed the machine for the agency has still to find Miss Right.

"I think it's because he's better at handling computers than he is girls", observed Joyce. "But he hasn't given up, hope yet".

Elite tops US charts

ELITE, the best selling cult adventure for the Electron, has become the first UK game to make it to the top of the American charts - on the Apple.

It reached the number one slot on Billboard - the prestige USA list - after some aggressive marketing by Firebird Licensees.

Originally brought out under the Acornsoft label, it subsequently became the property of Firebird, the software arm of British Telecom.

"It is the first non-American game to make it to the number one spot", says a Firebird spokesman, "so naturally we are delighted".

New courses link micro with voice

AN enhanced version of its Micro English language program has been released by LCL for the Electron.

The course, which takes children aged eight through to O level standard, now includes an option for users to put their own words into the Speak-and-Spell section.

Any audio tape recorder can be used with the new version and back-up copies of the program tapes are now

included free.

The course consists of 24 programs on three cassettes, or two discs and a voice tape, and costs £24.

Another release from LCL is Micro French which teaches users to read, understand and speak the language.

The course covers beginners through to O level GCE and GCSE and includes 24 programs with speech, animation and sophisticated multi-level help with errors.

On three discs and a voice tape, or three cassettes with manuals, Micro French costs £24.



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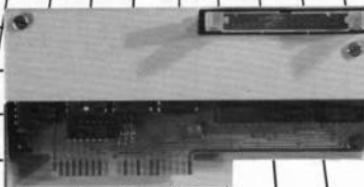
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ELECTRON USER, JUNE '86

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Beginners

DO you remember dealing with subroutines – sections of programs that can be used over and over again from the main program?

This is done courtesy of the keywords GOSUB, which sends the program to a subroutine, and RETURN, which sends control back to the main program.

We even saw how one subroutine can call another.

This month the subject is once again subroutines, as you'll see if you take a look at Program I.

In this case the program is more subroutine than anything else. Line 30 calls the sub-

```
18 REM Program I
28 silly = 100
30 GOSUB silly
40 END
100 REM a silly subroutine
110 PRINT "This is a silly
      subroutine"
120 GOSUB silly
130 RETURN
```

Program I

routine and, as it so rightly says, it is a very silly one indeed.

All it does is print the message and then GOSUB 100s again. In other words the subroutine is called again from within itself. While we might find this mind-boggling the Electron takes it in its stride.

The program goes to line 100 as instructed and starts again from there. Line 100 prints the message and the next line calls the subroutine once more.

This happens over and over again. Notice that the program never meets the RETURN of line 130, as the previous line always sends the program off round the subroutine again. The result of all this is that a series of:

This is a silly message
message appear. And then things grind to a halt with a:

Too many GOSUBs at line 120

The program has disappeared up its own subroutine. What's happened is that the

Using your stubs makes good sense

PETE BIBBY takes another look at the intricate delights of subroutine calls

micro has exceeded the number of subroutine calls the Electron can handle.

As we learnt last time, after each GOSUB the computer makes a note of the next line number so that it can find its way back after it meets a RETURN.

But, as we've seen, in this case the program never meets a RETURN. There's only so much memory available to keep track of the return addresses and when this is eventually used up the program crashes.

However don't let this put you off having subroutines call themselves – it can be a very powerful technique, so long as you stop the process before the memory gets full. Program II shows the technique.

The program uses the numeric variable *count* to keep track of the number of times that the subroutine calls itself.

So long as *count* is less than 10 the IF of line 130 allows the routine to call itself. In effect it behaves like the previous program.

The crunch comes when *count* is equal to 10. Now the

part after the IF is ignored, so the GOSUB isn't obeyed. The program goes on to the next line and finds a RETURN.

This tells it to go back to the line following the GOSUB that called that subroutine. Well the line that called it was line 130, so the line after it is line 140. And this is a RETURN, so the whole process begins again.

This happens nine times in all as the program keeps hitting the RETURN of line 140 and the subroutines unwind.

Finally the last RETURN send the program not to line 140, but to line 50, which is the one after the original subroutine call. As this is an END the program stops.

Don't worry if you find that a little difficult. It's one of those concepts that takes time to sink in. It's worth the mental effort though for it allows us to use a powerful programming technique known as recursion.

If you feel like you want to know more about that have a look at Notebook in the April 1988 *Electron User* but not before you're thrilled to the unique delights of Program III.

Take a close look at the subroutine defined between lines 100 and 150. Can you see anything unusual? If you can't, try counting the number of RETURNs. There are two instead of our usual one. Let's see how it works.

The first lines of the program just ask your age and store it in *age*. Then the subroutine is called and the program goes to line 100.

Ignoring the REM it moves on to the next lines, displays the message and moves onto line 130. What happens now depends on the value of *age*.

If *age* is less than 18 the

condition is true and the instruction after the IF of line 130 is obeyed.

Since this is a RETURN it means that if *age* is less than 18 the subroutine ends at that point. However should *age* be 18 or over the condition is false and line 130 is effectively ignored.

In this case the program goes on to lines 140 and 150, printing a second message for those over 18 who can legally buy a pint. The RETURN of line 160 ends the routine.

So that's how you can have more than one RETURN in a subroutine. In fact you could have a whole battery of them, tucked away behind IF statements.

However no matter how many you have the first condition that's true brings into play the RETURN that ends the subroutine. Try adding further messages to the subroutine in Program III.

```
18 REM Program II
28 silly = 100
30 count=0
40 GOSUB silly
50 END
100 REM a silly subroutine
110 PRINT "This is a silly
      subroutine"
120 count=count+1
130 IF count<10 THEN GOSUB
B silly
140 RETURN
```

Program II

```
18 REM Program III
20 messages=100
30 PRINT "How old are yo
u?";
40 INPUT age
50 GOSUB messages
60 END
100 REM messages
110 PRINT
120 PRINT "No matter what
your age, if you can read,
you can read this magazine
."
130 IF age<18 THEN RETURN
140 PRINT
150 PRINT "Why not read i
t in the pub with a pint?"
160 RETURN
```

Program III

aimed at the over 40s and over 60s.

As a word of warning never use a GOTO to jump out of a subroutine, as madness lies that way. Always use RETURN.

That's where we'll leave the mechanisms of subroutines and go on to see how they can help us create programs that work.

To do this let's suppose that we want to write a very simple program that just takes two numbers, multiplies them and gives the result. Almost immediately you should be able to see that the program divides naturally into three areas:

```
get the numbers
do the calculation
display the results
```

and each of these tasks could be handled by a separate subroutine, such as:

```
BOSUB get the numbers
BOSUB do the calculation
BOSUB display the results
```

This leads naturally to something like Program IV.

It's fairly obvious what's happening. The lines from 10

```
10 REM Program IV
20 BOSUB 100:REM get the
numbers
30 BOSUB 200:REM do the
calculations
40 BOSUB 300:REM display
the result
99 END
100 REM get the numbers
110 PRINT "get the number
"
199 RETURN
200 REM do the calculations
210 PRINT "do the calculations"
299 RETURN
300 REM display the result
310 PRINT "display the result"
399 RETURN
```

Program IV

to 99 form the main part of the program, containing our three subroutine calls.

The subroutines themselves are to be found in lines 100 to 199, 200 to 299, and 300 to 399. Notice how I've arranged that the subroutines start on a "hundreds" line number and end with a RETURN on a "ninety nine" number. Also notice that at present they do nothing but display what they are supposed to do.

Be that as it may, Program IV is one that works. Not only have we constructed it logically using subroutines, but we can also run it and check that it is performing as we expected and that the subroutines occur in the right order.

In this example it's easy enough to see what will happen without bothering to run the program, but imagine what it would be like if the subroutines called other subroutines, or even themselves.

This use of dummy subroutines - or stubs, as they are

known - comes in handy for keeping track of a program's logic and checking that it makes sense before spending a lot of time on the actual coding.

Once we've got a listing in the form of Program IV we can go on to make our programming life simpler by practising the age old technique of divide and conquer.

Obviously we need to put some proper working code into the subroutines to replace the messages, but rather than attempt to write all the subroutines at once let's take one at a time.

This not only makes the task less daunting, it also allows us to test each stage separately.

After all if we code all three subroutines at one time and then find that there's a mistake in the program the mistake could be in any of the subroutines.

If we only code one routine at a time and then test run the program if there's a mistake it must be something to do with that routine. The error becomes easier to track down and correct. Program V shows the results of this approach.

Here line 110 to 140 have replaced the previous stub. The result is that the subroutine now collects two numbers and stores them in first and second. This part of the program can now be tested and seen to work. If necessary temporary lines such as:

```
145 PRINT first,second
```

can be added to make it clearer what's happening. As a rule I always number these test lines with a line number ending with 5. This makes them easier to spot and delete in the final tried-and-tested listing.

Once we're sure that the first subroutine has done its job we can continue in the same fashion. One by one we code the following subroutines, testing each one as they are written. In the end we'll have a program such as Program VI.

This does the task asked

```
10 REM Program VI
20 BOSUB 100:REM get the
numbers
30 BOSUB 200:REM do the
calculations
40 BOSUB 300:REM display
the result
99 END
100 REM get the numbers
110 PRINT "Give me the fi
rst number"
120 INPUT first
130 PRINT "Give me the se
cond number"
140 INPUT second
199 RETURN
200 REM do the calculatio
ns
210 result=first*second
299 RETURN
300 REM display the resul
t
310 PRINT first " times "
;second" is "result
399 RETURN
```

Program VI

and, from the fairly logical task by task way it was created, we can be fairly confident that it will work. Also in this modular form, as it's known, the program is easy to change.

Suppose that now we had to take the two numbers and multiply the first by 10, the second by 12 and subtract one from the other.

All we'd have to do would be to change the expression in the second subroutine and the message in the third. The rest of the program would remain unaltered.

It's the same if we decided that first and second could only take values between 1 and 10. All we have to do is slot in another subroutine as Program VII shows.

Now the program has a new subroutine call at line 150. This calls the subroutine defined following lines 400 which just uses a compound condition to check that both numbers are in range. If they're not they have to be

```
10 REM Program V
20 BOSUB 100:REM get the
numbers
30 BOSUB 200:REM do the
calculations
40 BOSUB 300:REM display
the result
99 END
100 REM get the numbers
110 PRINT "get the number
"
199 RETURN
200 REM do the calculations
210 PRINT "do the calculations"
299 RETURN
300 REM display the result
310 PRINT "display the result"
399 RETURN
```

Program V

Beginners

From Page 11

re-entered.

I think you'll agree that this modular method of writing programs makes things easier. Taking things one at a time

allows even the most modestly gifted programmer to write quite complex routines with a minimum of errors.

If you find a better way of doing things later you can go

back to the appropriate subroutine and modify it.

We'll finish this month with an example of how stubs can help to find program errors. Have a look at Program VIII.

This seems to be a program that simply decides whether or not you can vote, but in practice there might be all sorts of information in the subroutines — when you'll be eligible to vote, where you can vote and so on.

Yet it has a fault. Try entering test values into the program and see what happens.

The problem lies in the fact that when you have age equal to 18, neither subroutine is called. That value of age drops through the conditions. Obviously the condition in line 50 should be \geq rather than $>$.

So as you can see stubs not only help you write programs more easily, but with the right test data they can also spot mistakes before you waste a

```
10 REM Program VIII
20 PRINT "What's your age
3?"'
30 INPUT age
40 IF age<18 THEN GOSUB
100:REM Too young
50 IF age>18 THEN GOSUB
200:REM Can vote
60 END
100 REM Too young
110 PRINT age " is too yo
ung"
199 RETURN
200 REM Can vote
210 PRINT age " can vote"
299 RETURN
```

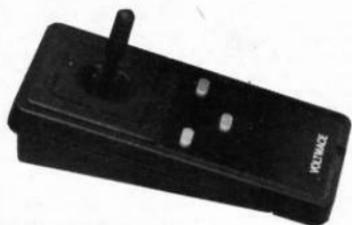
Program VIII

lot of time and trouble coding.

● That's where we'll finish for now. Try the divide and conquer method of programming for yourself — you'll soon see how it helps your programs improve. Next month we'll look at procedures.

Program VII

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Can you apply the brakes?

Program: Loony Loco

Price: £4.95

Supplier: Kansas City Systems, Unit 3,
Sutton Springs Wood, Chesterfield
S44 5XF. Tel: 0246 850357

IN Loony Loco the evil baron will stop at nothing to destroy the train. You play the part of the hero who must outwit the enemy and apply the brakes.

That little story is used by Kansas to link together four activities, all with a railway flavour.

In the first activity you drive an engine along a track with the scenery scrolling past in the background. To make life difficult for you airships and planes keep flying over and dropping bombs.

A well directed puff of smoke is required to prevent these from causing a disaster.

Also causing problems are runaway trucks. These can be avoided by firing a harpoon at them or by switching tracks at the numerous points along the way.

When you reach your destination you

progress to the next part of the game. In this you are running along on top of the carriages.

Not only do you have to leap smartly from coach to coach, but you must also jump over the balls which are rolling along, and duck under the arrows that are fired at you.

Your aim is to reach the buffet car to gain access to screen three.

Once in the buffet car you must catch the cups and saucers that are rolling along on conveyors.

The kindly railway management will allow you to drop a maximum of three while trying to catch the required 40.

Screen four is quite different from the others in that it is a logic problem, requiring you to set the eight switches to put the train's brakes on.

The trouble is you can only move switch eight if the other seven are correctly set and so on.

You are allowed 300 moves, and at first you'll need them. I think the lowest possible number of moves is 170.

Loony Loco is the best program I have



seen from Kansas City Systems. Screens one and two are fast and furious arcade action with good smooth graphics and useful sound effects.

Screen three is the weakest because the cups come in a soon predictable set pattern. The fourth screen is great fun to crack, but once learned it is no problem.

You can start the game on the screen of your choice. Overall it is a first-rate package and highly recommended.

Rog Frost

Sound	6
Graphics	8
Playability	8
Value for money	10
Overall	8

Creating adventures made easy

Program: The Quill

Price: £16.95

Supplier: Gilsoft, 2 Park Crescent, Barry,
South Glamorgan CF6 8HD. Tel: 0446
732765

GILSOFT are modest enough to call The Quill an adventure writer's utility. I would go a lot further than that. If you can't program in machine code then the Quill is an absolute must!

Although an adventure creator it produces machine code games. It consists of two parts - a database editor and an interpreter.

The main menu controls access to all the utilities you need, such as saving, testing and loading your creation.

Sub-menus cover printing, amending and inserting all the text, movement and status values for your adventure.

Your adventure is created using the tables which are available from the main menu.

Text is selected from the main menu, then from the sub-menu you can either insert new text with or without specifying a location, or amend text already entered.

After entering your text you are returned to the sub-menu and can then view it or get a printout.

Aside from text you also need to insert the data relating to the events that take place during the course of the game and this is done via three further tables -

movement, event and status.

The movement table is used to set the directions for each location and the room that each move will take the player to.

The event table specifies the actions the interpreter has to take to reply to a player's command, such as deciding whether an object can be dropped before allowing a player to DROP it.

The status table contains the entries handled by the interpreter that are independent of player input, such as keeping track of the player's inventory as he moves from location to location.

It is possible to assign synonyms by giving them the same word value. A random function of especial interest to Dungeons and Dragons fans, is incorporated by the implementation of a CHANCE command.

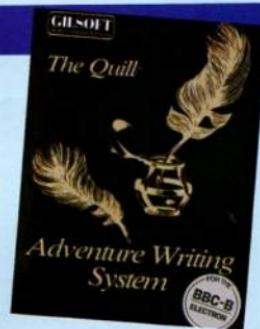
It is also possible to use up to 64 flags for situations that can occur during playing of the game.

They are simply variables that control situations and objects, such as whether or not a room is lit or how many objects a player is carrying.

The Quill allows a maximum of 253 locations and about the same number of objects and messages, so it is possible to create a lengthy adventure.

However if you go for large amounts of text you will find that memory limitations will affect the size of your adventure.

It is possible to save your creation in two ways, either as a database - in which



case you can load it back in and test it at a future time, or as a completed adventure in which case the interpreter is saved as well.

When saved as a completed adventure it will run independently of The Quill and Gilsoft have no objection to you marketing it provided you credit them with having used The Quill to produce it.

It is an absolute godsend to people who have the imagination, but not the programming ability, to create adventures. I simply cannot recommend it highly enough.

Paul Gardener

Documentation	8
Ease of use	9
Value for money	10
Overall	9

Getting into Frankenstein's mind

Program: *Frankenstein 2000*

Price: £6.95

Supplier: Audiogenic, 12 Chiltern Enterprise Centre, Station Road, Theale, Berks RG7 4AA. Tel: 0734 303663

IN *Frankenstein 2000* your aim is to revive the famous old monster which you have found on inheriting the infamous baron's castle.

In the futuristic world of 2000 AD your method is to shrink yourself down to a tiny size and enter the monster's body.

Stage one finds you in the monsters throat which is full of frogs. Your task is to destroy as many of these as possible during your journey downwards.

This is best described as a version of Space Invaders. As you travel you will sustain damage from colliding with frogs or the throat walls.

You will also use up oxygen. Too much of the first or too little of the second spells the end of your mission.

Before reaching the lungs a pellet of

oxygen must be shot. If you take a long time to hit it you won't have much oxygen for the next stage.

The activity in the lungs is very similar to the frogs in the throat, but here it is cigarette packets you must shoot. An added hindrance is bubbles of carbon dioxide which float up towards you.

After shooting another oxygen pellet you reach the heart where you steer through the various cavities to activate the implant.

It requires careful timing to get past the electrical impulses and to slip through the valves as they open.

A rather unpleasant task faces you in the stomach. You have to shoot the slices of greasy bacon, while avoiding the fried eggs.

Finally you reach the brain where, if you've got the oxygen supplies and a minimum of damage, you can knock out the bad neurons. This requires real precision, and I have not yet managed to do it. Audiogenic has an original idea with



this game, but it doesn't quite succeed.

Technically it's all fine with neat, fast graphics and it has pleasing sound effects.

However the whole program lacks any kind of extra feature to make it stand out from the crowd.

Rog Frost

Sound ...	6
Graphics	7
Playability	5
Value for money	5
Overall	5

Cracking fun at the towers

Program: *Crack It! Towers*

Price: £8.95

Supplier: Mirrorsoft, Maxwell House, 74 Worship Street, London EC2A 2EN. Tel: 01-377 4600

CRACK IT! Towers describes itself as a puzzle game for all ages. Mirrorsoft have done well to think of some kind of explanation because it's far easier to say what the program is not.

It certainly is not an arcade game or an adventure. It has educational elements, but it isn't a learning program.

What is it then? It's a whole load of fun for Electron and BBC Micro owners.

The aim is simply to find the secret of Count Crack It! You must collect seven golden keys which you'll need to open the eighth room in his castle.

To gain the seven keys you must visit various rooms and solve a set of puzzles and problems in each.

In room 1 in the castle you try to discover what Oswald eats for lunch. This can best be described as a hangman type game.

Success will earn you a key while failure will pitch you into the moat. If you end up in the moat the piranha will start swimming towards you.

A question such as 184 divided by 4 will flash on the screen. A correct answer will stop the fish and you will survive to visit more rooms.

Room 2 features a logic game in which you must shoot some beasties while

trying to avoid shooting yourself. It's a version of the ancient game of Nim and it's easy to make mistakes.

Room 3 looks a bit like space invaders, but with bats bombing you. Before you can fire back you need to match a subtraction sum with its correct answer.

This room is fiendish, requiring you to concentrate on three different areas of the screen, do a calculation and keep your base away from the bombs.

The castle swimming pool can be found in room 4. It will come as no surprise to learn that the Evil Count Crack It! keeps sharks in it.

To avoid them you will have to add a number to a sequence such as 5, 10, 15, 20 and so on.

Room 5 is the spiders' playroom. You have to move your stick of dynamite around to make a spider fall on it, but before any spider falls you must get a multiplication sum correct.

On to room 6 where Albert the Alien lives—in a minefield. In a limited time you must issue commands such as "west 3" to steer him to safety.

Room 7 features ghosts who won't destroy you if you are quick enough at solving an anagram.

You can enter the rooms in any order, but they all need unlocking by adding a set of numbers together.

If you succeed in any room you can try for a bonus key by entering the maze of 17 skulls. If you pick on the right skull, aided by a devious clue, you win. The



Count keeps many more nasty friends who leap out at unexpected moments and steal precious keys or put you into prison.

Some of these can be stopped by hitting Space, but others require you to complete words or solve number problems very quickly.

If you get fed up with the words defined in the program you can enter your own selection.

My whole family have found this an addictive program. None of the tasks are difficult in themselves, but to succeed you will need fast reflexes and an alert brain.

Mirrorsoft has come up with something quite out of the ordinary and for my money, it's a real winner.

Rog Frost

Sound ...	6
Graphics	7
Playability	10
Educational value	9
Value for money	9
Overall	9

Compilation of the old and new

Program: Action Pack 2

Price: £4.99

Supplier: Alligata, 1 Orange Street,
Sheffield S1 4DW. Tel: 0742 739061

THIS collection of four games – some of them new – is only available from branches of W.H. Smith.

The first game on the tape, Video's Revenge, is a shoot-them-down space game using good quality, smooth graphics and adequate sound.

You can move your craft left or right as well as forwards and backwards, and the various nasties approach from above or below.

Like so many of these games it's simple but addictive. I really like the title screen which has a message scrolling across the screen while the game loads.

Q-Bix is a version of the classic in which you steer a character around a set of cubes, changing the colours of the top surfaces.

Of course there are adversaries who

try to bump in to you and cause you to lose one of your lives.

This game has poor graphics and is painfully slow. It will soon have you reaching for the Break key.

Tarzan Boy is an oldie and was reviewed as a single game in December 1985.

For those who missed that review Tarzan Boy is a four screen ladders and levels game, with an awful lot of problems to overcome.

Getting on to screen two is my limit in this attractive, smooth and flicker-free game. It is a little slow, but by hitting Break the game restarts with no sound, and a lot more speed.

The final game is Diamond Pete and this obviously has its origins in Repton. The aim is to collect 16 diamonds from each of 10 screens without letting any rocks fall on your head.

An added problem is the severe time limit. There are said to be 10 levels as well as the 10 screens, but I never got the chance to find out.

There is no way that this matches the



outstanding quality of Repton, but it is very good. It's smooth, fast and has good sound.

The problems are well thought out, and it provides a very good challenge.

Overall I thoroughly recommend this package. Three of the games would make excellent singles, so it is a real bargain to get all of them at such a low price.

Rog Frost

Sound	6
Graphics	8
Playability	9
Value for money	10
Overall	9

Welcome back old space friend

Program: Thrust

Price: £7.95

Supplier: Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.
Tel: 0532 459453

REMEMBER the days when Space Invaders were king, and the buzz which went round the arcades when Galaxians appeared? If you do then you must buy yourself a copy of Thrust from Superior Software. Loading up Thrust was like discovering an old master in the attic.

Your spacecraft and all buildings and gun emplacements are displayed as high resolution line drawings.

The game is played as a series of missions of increasing complexity. In the first one the drive unit is on the planet's surface, along with a fuel dump, gun emplacement and nuclear reactor. In subsequent missions the drive will be located in underground caverns.

Fuel can be taken on board by hovering over the dump and activating the tractor beam. Hovering is achieved by pointing the ship away from the planet and using short bursts of thrust to counter the effects of gravity.

The gun emplacements are deadly accurate but can be taken out by a single shot. Firing at the nuclear reactor will halt the operation of the guns for a short while.

Having located the drive unit, the tractor beam can be used to tow it behind your ship, and this is where the fun really begins.

The programmer must be either an ace physicist or an articulated lorry driver, because the drive unit hangs beneath the ship like a pendulum attached to a fixed point on the ship by a solid bar.

Each movement of your craft will cause a realistic movement of the pendulum. As a pilot you must fly as smoothly as possible, counteracting every swing of the drive unit.

Should the swing become uncontrollable you will surely be dragged into a cavern wall.

The mission is completed by towing the drive unit into space and jumping into hyper space. As with every good arcade game, there is an opportunity for the arcade aces among you to earn big bonus points.

Having emerged from the cavern with drive unit in tow you can fire on the reactor until it goes critical, at which point



you have five seconds to make your hyperspace jump. This feat of bravado will earn you an additional 2000 points.

Thrust is a classic game, a game at which the natural games player will excel. This is a definite contender for my game of 1986.

Jon Revis

Sound:	8
Graphics	9
Playability:	10
Value for money:	10
Overall:	10

Commanding the star wars

Program: Star Force Seven

Price: £2.99

Supplier: Bugbyte, Liberty House, 222 Regent Street, London W1R 7DB. Tel: 01-439 0666

STAR Force Seven is a military strategy game set in a futuristic space context.

You take the part of the space fleet commander, battling for 25 planets and trying to prevent the marauding Zurgs from invading Earth.

Your first task is to decide how many of the various types of spacecraft you require. You have a limited number of points and must choose carefully between cruisers, transporters, spy ships and so on.

Having made your decision, you decide which star to visit first. There are 26 stars and, to make life easy, each starts with a different letter.

When you reach a star your main options begin. You can get intelligence reports on the size and population of the various planets.

You may move into orbit around a planet and assault it or bombard it. If there are any enemy space fleets around

you can attack them either in a random way or by picking off individual craft.

If the pressure gets too much for you you can do a star jump and hope to find somewhere safer and quieter.

This is not an arcade type of game so there is no graphic action which you control. You make general decisions and the computer then carries out the action.

When you are battling to win a planet the display consists of the numbers of troops remaining, both your own and those of the enemy.

I found this game rather dull to play. It looks like the kind of game that we had five or six years ago when computers had limited graphics capabilities.

It does not offer a real chance to use your own skills and relies too much on random happenings.

Another factor I disliked was that on being destroyed I had to reload data to be able to play again.

I'm afraid I even found the rather limited sound an irritant. Thankfully this can be switched out.

There are five difficulty levels ranging from easy to difficult, but even level 1 was too hard for me.

If you like this kind of strategy game no



doubt you would be pleased to add this to your collection. I'd prefer to invest my money elsewhere.

Rog Frost

Sound	3
Graphics	4
Playability	4
Value for money	6
Overall	4

Rick, the supreme secret agent

Program: Rick Hanson

Price: £9.95

Supplier: Robico, 3 Fairland Close, Llantrisant, Mid Glamorgan CF7 8QH. Tel: 0443 227354

ROBICO is well known for the quality of its BBC adventures and so it was with some interest that I tackled its first Electron game.

You play the part of Rick Hanson, secret agent. Your mission is to assassinate General Garantz, an evil criminal who is threatening to explode a nuclear bomb in New York unless he is paid a ransom.

You begin your mission in a railway station. An initial exploration of the 14 locations surrounding you reveals several objects, all of which are useful.

A visit to the telephone box should give you further information about your mission, but reversing the charges is a throw-away line.

After collecting everything else you can find you must look for a route out of the station. Leaving by the front door is not the answer as you will soon discover.

Hesitation can also prove fatal as one

of the general's men is somewhere inside looking for you with evil intent.

To get on the right track, or rather over it, head back to the bridge. A passing train is on, and in time.

The guard should be dealt with quickly, so put a spanner in his works. Leaving the train will find you in a village with more exploring to do.

There's lots to do here and if you take a gamble in the tavern you will find you can stay the night.

You must now try not to avoid too close a shave, and cracking the code should see you well equipped to solve the remaining puzzles before leaving the village.

I am very impressed with this game. It has about 220 locations and is totally logical. Packaged with the game is a card which entitles you to help if you get stuck.

Also enclosed is a smart adventurer's notebook. This is about the size of a diary and consists of blank, coloured pages. I'm not sure how useful this is, but it does add an air of professionalism to the game.

The program uses screen memory because of its size so you only see 18 lines of text at any one time.

Rick Hanson is nothing less than



brilliant and Robico must now join Epic as being the software houses for adventures on the Electron.

I look forward to spending time on the follow-up version, Rick Hanson II, which from initial impressions seems to be every bit as good.

Paul Gardener

Presentation	9
Atmosphere	9
Frustration factor	9
Value for money	10
Overall	9

HOWZAT! simulates a full innings between England and Australia or teams of your choice. After entering the teams you want you must choose which players are to bowl, in order of skill. The game then begins.

Once into the game you are shown the scorecard at the beginning of each over and select a new bowler. The current batsman facing and the last bowler are highlighted.

The player controlling the fielding team should press 1 to 6 – but not the previous bowler's number – to select the new bowler. The batting player can press D to declare.

The main screen is a graphic representation of the pitch. At the top is the scoreboard showing the teams' scores, wickets lost, the batsmen's scores and the bowler.

The Electron will automatically bowl and try to hit the ball – success depends on the respective skills of the bowler and batsman. If the ball is hit the player batting will be asked if he wishes to run or not.

If he does the batsmen will dash across the wicket while the nearest fielder will attempt to run them out. LBWs, catches, bowled-outs and drops are all computer controlled.

Every time a wicket is lost the program will return to the scorecard to select the new batsman.

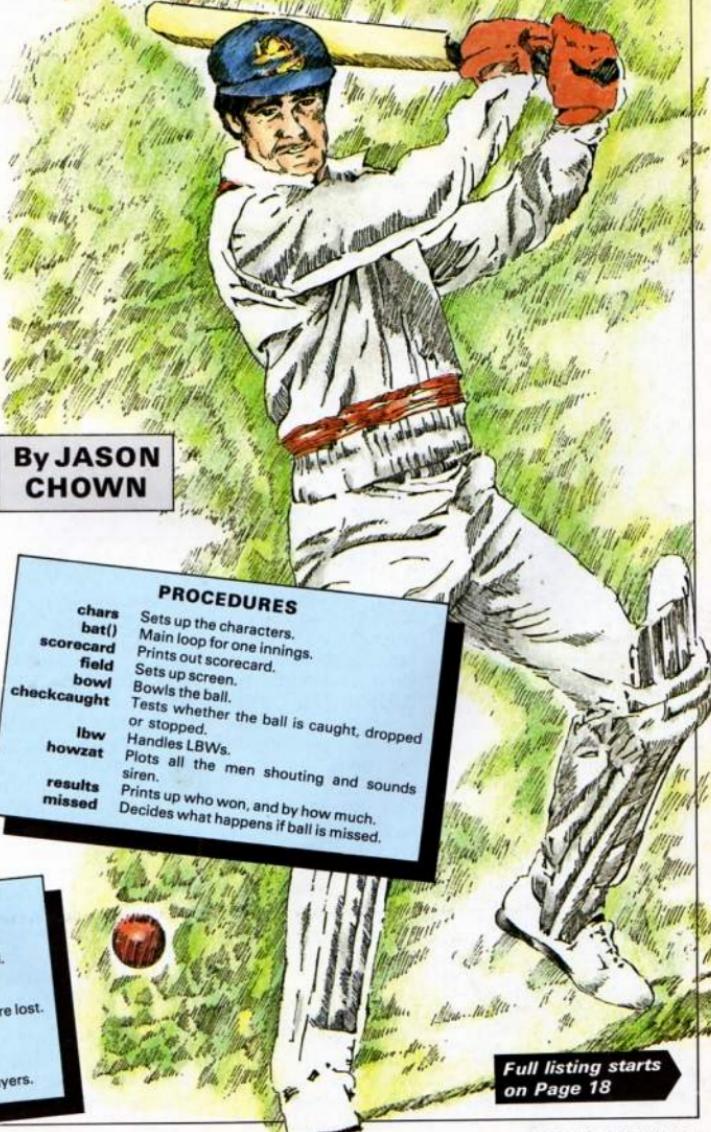
If you wish to have a limited overs game then simply declare after a fixed number of overs.

If you want to play twice – hence a two innings match – then you won't want the program to automatically declare after the second player has exceeded the first's score, so change line 670 to:

670 UNTIL wk% (T%)=10 OR
declared%

VARIABLES	
T%	Current team.
O%	Other team.
ov%	Number of overs played.
X%, Y%	Coordinates of ball.
bt%	Batsman facing.
W%	How many wickets were lost.
bwn%(5,1)	Bowler number.
bws%(5,1)	Bowler skill.
bts% (10,1)	Batsman skill.
n\$(11,1)	Name of team and players.

HOWZAT!



By JASON
CHOWN

PROCEDURES

chars	Sets up the characters.
bat()	Main loop for one innings.
scorecard	Prints out scorecard.
field	Sets up screen.
bowl	Bowls the ball.
checkcaught	Tests whether the ball is caught, dropped or stopped.
lbw	Handles LBWs.
howzat	Plots all the men shouting and sounds siren.
results	Prints up who won, and by how much.
missed	Decides what happens if ball is missed.

Full listing starts
on Page 18

Howzat listing

England after 8 overs						
	Batsman		Bowler		Wkts	
1. Gooch		run out				
2. Gower						
3. Lamb						
4. Lamb						
5. B.Botham	c.Hilldrift	b.Wood				
6. Denton						
7. Emburey						
8. Ellison						
9. Taylor						
Extras:						8
Total					8 for 2	
Bowler	Sk	Ov	Mdns	Runs	Wkts	
1. Wood	♦♦♦	1	0	0	0	
2. Mellsell	♦♦♦	0	0	0	0	
3. Border	♦♦♦	0	0	0	0	
4. Ritchie	*	0	0	0	0	

```

498 VDU23,224,8,188,146,1
46,146,146,146,146,23,225,3
8,16,98,98,82,82,76,76
500 VDU23,226,8,8,8,0,56,
56,56,16,23,227,68,121,185,
56,56,48,68,66,23,228,68,12
1,185,56,34,40,48,48
510 VDU23,229,156,92,68,3
8,29,48,68,66,23,238,8,0,0,
8,112,112,112,32,23,231,112
128,116,116,116,116,84,88,22,8
3,232,112,128,116,116,114,8
4,88,88,23,233,56,128,184,1
84,184,168,168,48
528 VDU23,254,8,8,8,0,8,1
29,153,98,23,255,98,126,68,
68,68,36,36,102
530 ENDPROC
540 DEFPROCinput
550 IF Mz=0 a$="Team "+ST
R$(T+1)+"!" ELSE a$="Playe
r "+STR$Mz+";"
560 PRINTTAB(Tx*20,Mz+4-(

Mz))a$;
570 INPUT# "n$(MX,TX)
580 ENDPROC
590 DEFPROCbat(TX)CLS
600 bt1=1:bt2=2:bn1=6
610 REPEATTrans$=0:ho$(bt1
X-1,TX)="not out":ho$(bt2-
1,TX)="not out":PROCscoreca
rd:PROCnewbowler
620 FORbowis#=1TO6
630 IFWk$(TX)=1ANDNOT(TI
=1ANDtot(X$)(tot(X1))ANDNOT
declared$PROCfield:PROCbowl
640 NEXT:IFNOTdeclared$ o
v\=o\y\=1
650 A2=bt1:bt1=bt2:bt2
I=A1
660 IFNOTdeclared$PROCadd
670 UNTILwk$(TX)=100Rdecl
ared$OR(TX=1ANDtot(X$)<(totX
(1))
680 PRINTTAB(0,31)"Inning
s Closed. Press any key..."'
:=A:GET:ENDPROC
690 DEFPROCscorecard
700 CLS
710 PRINTN$(8,TX);" after
"jov\;" overs"
720 totX(TX)=0
730 FORMX=1TO11:IFMz=bt1
COLOUR:COLOUR129ELSECOLOUR
1:COLOUR128
740 PRINT:MX;","TAB(3)n$(

MX,TX)TAB(1)ho$(MX-1,TX)TA
B(3)n$(MX,TX):totX(TX)=t
otX(TX)+rn$(MX,TX):NEXT
750 COLOUR:COLOUR128
760 PRINT;"Extras:"TAB(J3
);rn$(8,TX)
770 totX(TX)=totX(TX)+rn$(

8,TX)
780 PRINT;"Total:"TAB(38)
;totX(TX)" for ";wk$(TX)
790 IFov$(8) ANDT0x8 PRINT
" (averaging ";INT(tot
X(1)/(ov1*100)/100;" an over
")
800 IFTx=1 IFovX-10>0 PR
INT" (averaging ";INT(
totX(1)/(ov1-10)>100/100;
" an over"
)
810 PRINT"" Bowler
820 Ov Mdns . Runs Wkts-
-----
820 Ov=-NOTTx:IFox=20X=0
830 FORMX=8705:Fbn1=MxCO
Lour$:COLOUR129ELSECOLOUR1:
COLOUR128
840 PRINT;MX+1;."TAB(2)n
$(bwn1(MX,01),01):TAB(12):$
TRING$(bw$w1(MX,01)/J+1,"")
:TAB(18):bw$w1(MX,01,B):TAB(25):
bw$w1(MX,01,X):TAB(32):bw
$w1(MX,01,Z):TAB(38):bw$w1(M
X,01,J)
850 NEXT:COLOUR1:COLOUR12
8
860 ENDPROC
870 DEFPROCnewbowler
880 REPEATPRINTTAB(8,28)S
PC(28)TAB(8,28)"Bowler numb
er or 'D' to declare. ":"A=
GET$:UNTILA$="D"OR"(VALA$=0
ANDVALA$>7)ANDVALA$<(bn1+1)
890 IFA$="D"declared$=TRU
E:ENDPROC
900 bwf$(VALA$-1,0,X,0)=bw
f$(VALA$-1,0,X,0)+1
910 bn1=VALA$-1
920 ENDPROC
930 DEFPROCfield CLS:REST
ORE 978
940 MOVE1258,288:DRAW1180
,28:DRAW188,28:DRAW38,280:D
RAW38,700:DRAW180,988:DRAW1
100,888:DRAW1250,700:DRAW12
50,288
950 PRINTTAB(18,18)CHR$12
BTAB(38,18)CHR$128
960 FORMX=8709:READX,Y:
PRINTTAB(X,Y,-1)CHR$13#TAB
(X,Y)CHR$13:NEAT
970 DATA27,28,8,21,18,23,1
3,6,18,18,31,6,7,18,31,27,2

```

From Page 17

```

From Page 17

18 REM Howzat!
20 REM A cricket game
30 REM for two players
40 REM By Jason Chown
50 REM with ideas from
60 REM Christian Chown
70 REM (c) Electron User
80 #FX220 17
90 DATAEngland,Bosch,Rob
inson,Gower,Batting,Lamb,Bo
tham,Downton,Embrey,Edmond
s,Ellison,Taylor
100 DATAAustralia,Wood,Hi
lditch,Messels,Border,Boon,
Ritchie,Phillips,Holland,La
wsom,O'Donnell,McDermott
110 MODE=PROChars
120 PRINTTAB(5,18)"Press
D for default teams"
130 PRINTTAB(5,12)"Engla
nd v Australia"
140 PRINTTAB(5,14)"or I t
o input your own teams."
150 PRINTTAB(5,17)"Please
ensure Caps lock is on."
160 REPEAT#=$GET$:UNTIL#=
"%"OR#=$"D"
170 ENVELOPE1,18,1,-1,0,1
,0,126,0,0,-126,126,126
180 DIM n$(11,1),bwn%(5,1
),bws%(5,1),bts%(18,1),rn%
(11,1),bwf%(5,1,3),ho$(18,1
),wk$(1),tot$(1)
190 I=RND(-TIME)
200 CLS
210 IF#A$="I"COLOUR129:COL
OURB:PRINTTAB(12,1)"ENTER N
AMES":VDU28
220 FORT#=BT01:FORMX#=BT01
1
230 IF#A$="D"READn$(M%,TX)
ELSE PROCinput
240 NEXT,
250 FORT#=BT01:MODE4:PRIN
T"TAB(15):;COLOURB:COLOUR12
9:PRINTn$(#,TX):COLOUR1:COL
OUR12B:PRINT" name bat
ting skill bowling":FOR
M%#=T011
260 bts%(M%-1,TX)=(10-M/
2)*VAL("1."^$TR#(RND(9)))
270 PRINT;MX#;" ";n$(M%,T
%)TAB(15):STRING$(bts%(M%-1
,TX)/41,"*")
280 NEXT
290 PRINT"
300 FOR B#=BT05:REPEATPRI
NTTAB(8,20)SPC(48):=INPUTTA
B(8,20)"Bowler number:"N%
310 F#=1:FORSX#=BT0B#;IFbw
n$(SX%,TZ)=NZF#=-1
320 NEXT
330 UNTILNOTF#ANDNZ%>BANDN
%#12
340 PRINTTAB(26,N%+3)"Bow
ler no.":B%#1:bwn$(B%,TZ)=N%
I
350 bws%(B%,TX)=(B%-B%*1.5
)+RND(4)
360 NEXT:PRINTTAB(8,38)"P
ress any key to go on.":A=
GET
370 NEXT
380 VDU23:8282#;0#;0#;
398 VDU19,0,2;0#;19,1,0#;
408 PROCTossup
418 ovI#=0
428 declaredI#=0
430 PROCbat(8):I:ovI#=ov%
448 declaredI#=0
450 PROCbat(1)
468 PROCreults
478 END
488 DEFPROChars

```

```

8,25,28,14,38,28,36,28
988 READIX,YI,XZ,YI;PRINT
TAB(XI,YX-1)CHR#130TAB(XI,Y
)CHR#131
998 PRINTTAB(28,17)CHR#13
8TAB(28,18)CHR#137TAB(12,17
)CHR#134TAB(12,18)CHR#135
1000 ENDPROC
1018 DEFPROCbowl
1028 PRINTTAB(18,0)n$(0,TI
)" are :tot$(TI)" for :"m
k$(TI):IFT#1=PRINTTAB(28,1
):tot$(0)-tot$(1)+1;" to win
-"
1038 PRINTTAB(8,1)n$(bt1X,
T)TAB(12);rn$(bt1X,T) n$(
bt2X,T);TAB(12);rn$(bt2X,T
)
1048 PRINTTAB(15,2)n$(bt1X
,T) " facing "n$(bwn$(bn2,0
),0X)
1058 PRINTTAB(1,38);bowlsX
1068 FORZ#3=670400STEP-1:PR
INTTAB(ZI,19)CHR#130TAB(ZI,
20)CHR#131TAB(ZI+1,19) "TA
B(ZI+1,20) " :FORC#1=TO1000
:NEXT,
1078 PRINTTAB(38,19)CHR#13
8TAB(38,20)CHR#133
1088 paceI=68-bws$(bn1,TI
)*6:IpaceI<0:paceI%8
1098 FORZ#1=950TO400STEP-16
:PROCbball(BX,458-BL/15):6C0
L8,B:PROCbball(BX+16,458-BI
+16/15):FORZ#1=TOpaceI:NEI
:T:6C0L8,1:NEXT
1108 PROChit
1118 ENDPROC
1128 DEFPROChit:PRINTTAB(1
,2,18)CHR#136
1138 #FX15
1148 SOUND8,-18,2,3
1158 outZ=8
1168 IX=TRUE
1178 IFRND(4)=1AND(bts$(b
t1X-1,TI)+8=RND(28))<(bws
$(bn1,0X)+RND(28)):PROCbout:
IX=8
1188 IFbts$(bt1X-1,TI)+RND
(28)>10ANDIX PROCbhigh:I1=
8
1198 IFbts$(bt1X-1,TI)+RND
(28)>17ANDIX PROCdinky
1208 IF1XPROMCassed
1218 IFout$PROChewman
1228 I=RND(-TIME)
1238 ENDPROC
1248 DEFPROCdinky I1=0:PRO
Csmallhit

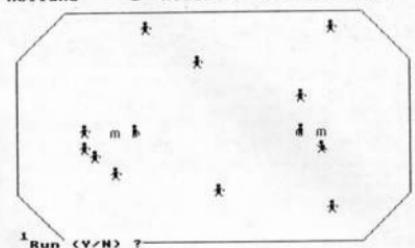
```

```

1258 IF XX>100ANDIX<1178AN
DYI>100ANDYI<800ANDNOToutI
PROCrunning ELSE IF NOToutI
PROCadd2(4):PRINTTAB(18,3)
"FOUR RUNS!":A=INKEY(300)
1268 ENDPROC
1278 DEFPROCbhigh A=RADRN
D(368)
1288 IFRND(10)=1PROCsix:EN
DPROC
1298 XI=28+COSAYI=28+SINA
1308 XI=400+XI+XI:YI=448+Y
Z+Y
1318 6COL3,1:PROCbball(XI,Y
)
1328 REPEAT
1338 PROCbball(XI,YI)
1348 XI=XI+XI:YI=YI+YI
1358 A=INKEY(1)
1368 PROCbball(XI,YI)
1378 UNTILPOINT(XI+XI,YI+Y
)
1388 IFPOINT(XI+XI,YI+YI)=
1ANDIX>200ANDIX<103ANDYI>
30ANDYI<800PROCcheckcaught:
I1=0:IFNOToutI:PROCrunning:E
NDPROC
1398 IFPOINT(XI+XI,YI+YI)=
1 ANDYI<888 PROCrunning:END
PROC
1408 IFI1=ENDPROC
1418 REPEAT
1428 PROCbball(XI,YI)
1438 XI=XI+XI:YI=YI+YI
1448 A=INKEY(1)
1458 PROCbball(XI,YI)
1468 UNTILPOINT(XI+XI,YI+Y
)
1478 PRINTTAB(18,3)"FOUR R
UNS!":
1488 tot$(TI)=tot$(TI)+4:I
FABS(YI)<10ANDXI<-1PRINTA
B(15,4)"(extras)":rn$(0,TI
)=rn$(0,TI)+ELSERn$(bt1X,TI
)=rn$(bt1X,TI)+4:runsI=runs
I+4
1498 A=INKEY(400)
1508 ENDPROC
1518 DEFPROCsix
1528 XI=28+COSAYI=28+SINA
1538 XI=400+XI+XI:YI=448+Y
Z+Y
1548 6COL3,1
1558 PROCbball(XI,YI)
1568 REPEAT
1578 PROCbball(XI,YI)
1588 XI=XI+XI:YI=YI+YI
1598 A=INKEY(1)
1608 PROCbball(XI,YI)

```

Hilditch Australia are 8 for 4
Hilditch facing Botham



```

1618 UNTILPOINT(XI+XI,YI+Y
)
I1=TRUE
1628 PROCbadd2(6)
1638 PRINTTAB(18,3)* S I X
R U N S ! "
1648 SOUND1,1,56,48
1658 A=INKEY(400):ENDPROC
1668 DEFPROCsmallhit A=RAD
RND(368)
1678 XI=28+COSAYI=28+SINA
1688 XI=400+XI+XI:YI=448+Y
Z+Y
1698 6COL3,1
1708 PROCbball(XI,YI)
1718 REPEAT
1728 PROCbball(XI,YI)
1738 XI=XI+XI:YI=YI+YI
1748 PROCbball(XI,YI)
1758 A=INKEY(3)
1768 XI=RND(6):UNTILPOINT(
XI+XI,YI+YI)<>80RAz=6
1778 IFPOINT(XI+XI,YI+YI)<
>10ANDIX<1178ANDYI>
10ANDYI<800PROCcheckcaught
:ENDPROC
1788 ENDPROC
1798 DEFPROCbout
1808 XI=8
1818 IFRND(6)=1PROCdinky:E
NDPROC
1828 IFRND(4)=1PROCkeeper:
ENDPROC
1838 IFRND(4)>4:ENDPROC
1848 IF(bts$(bt1X-1,TI)+18
+RND(28))<(bws$(bn1,0X)+RND
(28)):PROCbowed
1858 IFRND(10)=1PROCbw:EN
DPROC
1868 ENDPROC
1878 DEFPROCkeeper:PRINTTA
B(18,3)"Wicket Keeper";A=I
NKEY(100):I1=0:ENDPROC
1888 DEFPROCcheckcaught IF

```

Howzat listing

From Page 19

```

2118 ENDPROC
2120 DEFPROCcaught RESTORE
970
2138 PROCfnear
2140 n$=n$(NZ+1,0%)
2150 IFn$=n$(bn$(bn%,0%),
0%)PROCordman
2168 IFn$=10A$="c & b "+n$(
bn$(bn%,0%),0%)ELSE$="c,
"+n$+" b."+n$(bn$(bn%,0%),
0%)
2170 PROChowzat
2180 PRINTTAB(0,30)"HOWZAT
! ("A$")" "Press any key...
";:out":=1:hof(bt1%,TX)=A
$:A=$GET:ENDPROC
2190 DEFPROCrndman
2200 REPEATn$=RND(10)-1:n$=
=n$(NZ+1,0%)
2210 UNTILn$<n$(bn$(bn%,
0%),0%)
2220 ENDPROC
2230 DEFPROChowzat
2240 RESTORE970
2250 FORSI=$T01%;READXX,YI
2260 PRINTTAB(IY,YI-1)CHR$
254TAB(IY,YI)CHR$255
2270 NEXT
2280 SOUND1,1,100,40
2290 ENDPROC
2300 DEFPROCbowled ho$(bt1%
-1,TX)="b. "+n$(bn$(bn%,0%),
0%)PRINTTAB(10,18)CHR$1
29:PRINTTAB(0,30)"HOWZAT!"(
bowled "n$(bn$(bn%,0%),0%)
")" "Press any key...";:PRO
Chowzat:$GET:out":=1:ENDPR
OC
2310 DEFPROCResults:CLS
2320 PRINTTAB(10,10)"RESUL
TS"
2330 PRINTTAB(5,15)n$(0,0)
:TAB(20):tot$(0):FNwk(wk$(0
))
2340 PRINTTAB(5,20)n$(0,1)
:TAB(20):tot$(1):FNwk(wk$(1
))
2350 ITot$(0):tot$(1)PRIN
T' SPC(10)n$(0,0)" win by "
:tot$(0)-tot$(1)" runs."
2360 ITot$(0):tot$(1)PRIN
T' SPC(10)n$(0,1)" win by "
:10-wk$(1)" wickets."
2370 ITot$(0):tot$(1)PRIN
T' SPC(10)TAB(10)"match dra
wn."
2380 ENDPROC
2390 DEFFNwk(WX)IFWZ=10:="
all out"ELSE:=# for "+STR$
(WZ)+" dec."
2400 DEFPROCadd2(a%)IFIX%0
ANDABS(Y%)<200PRINTTAB(25,3
)'(extras):rnZ(0,TX)=rn$(0
,TX)+a%:ENDPROC
2410 rn$(bt1%,TX)=rn$(bt1%
,TX)+a%
2420 IFaXMOD2=1 AX=bt1%:bt
11=bt2%:bt2%=AX
2430 tot$(TX)=tot$(TX)+a%
2440 runs$=runs$+a%:ENDPRO
C
2450 DEFPROCmissed
2460 AX=RND(40)
2470 IFAZ=1 PROClibw:ENDPRO
C
2480 IFAZ<4 PROCbowled:END
PROC
2490 IFAZ<10 PROCdinky:END
PROC
2500 IFAZ=10 PROCbighit:EN
DPROC
2510 PROCkeeper:ENDPROC
2520 DEFPROCtossup CLS
2530 OI=RND(-TIME)
2540 AX=RND(2)
2550 PRINTTAB(5,8)n$(0,AZ-
1)" wins the toss..."
2560 PRINTTAB(10,10)"Bat f
irst or second ?"
2570 PRINTTAB(15,14)"1/2"
2580 REPEATBZ=$GET-48:UNTIL
AX=BANDAX<3
2590 IFAZ>BXDEPROCswap
2600 ENDPROC
2610 DEFPROCswap
2620 FORTZ=$T01%;A$=n$(TX,
0):n$(TX,0)=n$(TX,1):n$(TX,
1):A$=NEXT
2630 FORTZ=$T01%;AZ=bts$(T
X,0):bts$(TX,0)=bts$(TX,1):
bts$(TX,1):A$=NEXT
2640 FORTZ=$T05%;AZ=bws$(T
X,0):bws$(TX,0)=bws$(TX,1):b
ws$(TX,1)=A
2650 AZ=bwn$(TX,0):bwn$(TX
,0)=bwn$(TX,1):bwn$(TX,1)=A
%:NEXT
2660 ENDPROC
2670 DEFPROCrunning
2680 PRINTTAB(0,31)" Run
(Y/N) ?"
2698 S%=$Z:G%=$
2700 REPEATA$=$GET:$UNTILA$=
="#"DRA$="#"
2710 PRINTTAB(0,31)SPC(28)
2720 IFAS="N" ENDPROC
2730 PROCfnear:IY=XX/32:YI
=(1023-YI)/32
2740 REPEATS%=$I+1
2750 PROCrun
2760 IF NOTout% PRINTTAB(8
,31)" Run (Y/N) ?";:REPEAT
A$=$GET:$UNTILA$="Y" DRA$="N"
2770 PRINTTAB(8,31)SPC(28)
;
2780 UNTILout%DRA$="N"
2790 IFNOT out% PROcad2(S
%) ELSE PROChowzat:PRINTTAB
(18,31)"Run out":=1:GET:out
I$=TRUE:ho$(bt1%-1,TX)="run
out"
2800 ENDPROC
2810 DEFPROCfnear
2820 RESTORE970
2830 NS$=1000:NX=0
2840 FORWZ=1TO11
2850 READAX,BZ:I=ABS(AZ-XI
/32)+ABS(BZ-(1023-YI)/32):(N
S NX=$ABS((AZ-XI/32)+ABS(BI
-(1023-YI)/32)):MXI=AZ:MYZ=B
Z:NZ=WX-1
2860 NEXT
2870 ENDPROC
2880 DEFPROCrun
2890 NZ=12:REPEAT
;
2900 IF G% PROChowzat ELSE
PROCmove
2910 PRINTTAB(MYX,MYZ-1)CH
R$13BTAB(MYX,MYZ)CHR$13I
2920 PROCmen
2930 UNTILout% OR NX=28
2940 ENDPROC
2950 DEFPROCmove
2960 PRINTTAB(MYX,MYZ)" "T
AB(MYX,MYZ-1)" TAB(10,18)C

```



```

HR$128
2970 IFMXX>XXANDNZM002=1 M
XI=MXX-1
2980 IFMXX<XXANDNZM002=1 M
XI=MXX+1
2990 IFMYY>YYANDNZM002=1 M
YI=MYZ+1
3000 IFMYY>YYANDNZM002=1 M
YI=MYZ-1
3010 IFMXX=XXANDMYI=YI G%=
TRUE:XX=XX+32:YI=1023-YI+32
3020 ENDPROC
3030 DEFPROCmen PRINTTAB(N
,1,17)" TAB(NX,18)" TAB(48
-NX,17)" TAB(48-NX,18)" "
3040 NI=NZ+1
3050 PRINTTAB(NX,17)CHR$13
BTAB(NX,18)CHR$13BTAB(48-NX
,17)CHR$13BTAB(48-NX,18)CHR
$13I:ENDPROC
3060 DEFPROCthrow
3070 GCOL8,0:PROCball(XX,Y
Z)
3080 IFIXX>330 XX=XX-16
3090 IFIXX<330 XX=XX+16
3100 IFYX>448 YZ=YZ+16
3110 IFYX<448 YZ=YZ-16
3120 GCOL8,1:PROCball(XX,Y
Z)
3130 IF ABS(XI-330)<2BANDA
BS(YI-448)<20 outI=TRUE:PRI
NTTAB(10,18)CHR$129:PRINTTA
B(MYX,MYZ)" TAB(MYX,MYZ+1)"
";
3140 ENDPROC

```

This listing is included in this month's cassette tape offer. See order form on Page 53.

IF you own Acornsoft's excellent word processor View, but have been disappointed to find that it does not allow you to use different print styles within a document, then this routine is for you.

The manual says a printer driver is needed to allow underlined or bold text. Such a driver is available for Acornsoft on cassette for around £10. It contains a collection of routines for different printers.

The program presented here sets up a printer driver for use with any Epson-compatible printer.

It allows eight different print styles – underlined, bold, italics, double strike, NLQ, condensed, elite, enlarged or just about any combination of these.

The driver also provides a pad character, or absolute space.

View sets aside one page of memory, &400 to &4FF, for a printer driver. Unfortunately the routine must be written in machine code, and very efficiently too, to cram as much useful code as possible into the 256 bytes available.

Program I sets up the required machine code routine and saves it to tape or disc.

It is essential that the program is entered very carefully as typing errors in assembly language are extremely difficult to spot and any mistake will only become evident when View refuses to print out your document correctly.

The driver code is saved under the name GLP since this is the name of my printer – a Centronics GLP. It would be wise to save the program itself as well, under a different filename such as Driver.

After entering View type:

PRINTER GLP

or whatever you've called the driver, and press Return. The driver should load, and if all has gone well PRINTER GLP should appear on the screen underneath Screen Mode 6.

Now type in or load a piece of text. The default highlights, underlining and bold printing can be selected by pressing

Ring the typographical changes

IAN BROWN shows how to do it with his View Printer Driver

Func+H or Func+J before and after the text to be highlighted.

You'll see an inverse dash or asterisk printed on screen. However to select other print styles the HT stored command must be used.

Each of the eight print styles provided by the printer driver has a code, as shown in Table I. You will see that the codes 128 and 129 correspond to the two default highlights.

To select italics in place of underlining for instance, you would need to set one of the highlights to produce code 130.

Press Func+O to enter a stored command in the margin and enter HT followed by Return and type 1 130. You've now altered highlight 1, Func+H to print text in italics.

The same can be done with highlight 2, Func+J. For instance, enlarged text can be selected in place of bold

printing by using HT 2 135. Func+J will then produce enlarged print.

Take a look at Figure I to see how it's done.

It may seem from this that only two separate print styles can be used at any time. However, remember that a highlight code selected on a previous line will not be cancelled unless actually switched off so it is in fact possible to have double strike, underlined, enlarged, condensed, bold, italic printing if your printer can cope with that combination!

The printer driver switches off the paper end detector to allow printing right up to the end of the page if cut sheets are used.

As mentioned earlier, the driver also provides a pad character facility. Whenever an absolute space is required, that is one which will not be affected by formatting, type £ instead of pressing the Spacebar.

Thus typing:

ELECTRON£USER

will ensure that:

ELECTRON USER

is printed out with no extra formatting spaces, and not split over two lines.

In the actual printout the £ sign is replaced by a single space.

The £ character, CHR\$(96) was chosen as the pad

character because, on most printers, this code is printed as the largely useless ' sign. The printer driver simply intercepts this code and replaces it with CHR\$(32).

You can alter the pad character by changing the 96 in line 530 and if you want to print a £ use a hash instead which will print as a £ if the English character set has been selected.

The printer driver is loaded by View into page 4 of the Electron's memory. However the machine code cannot be assembled here because it is used by Basic to store the integer variables A% to Z%.

Therefore the code must be assembled elsewhere, but as if it was at &400 using OPT 4 and 6. This directs the assembler to assemble the code as if it was at %B but to store it at 0%.

View expects a jump table to be between &400 to &40E. The first JMP instruction, at &400, is called when a character is to be printed.

The second and third JMPs are executed to switch the printer on and off respectively.

The final two JMP instructions are associated with microspacing, but since most printers do not support proportional spacing there seemed little need for the driver to support this facility, and so

Code	Highlight
128	Underline
129	Bold
130	Italics
131	Double strike
132	NLQ
133	Condensed
134	Elite
135	Enlarged

Table I: Highlight codes

From Page 21

they just point to an RTS command.

The subroutine *pron* starting at line 180 is called to switch the printer on. It checks the location labelled *init* to see if this is the first time the routine has been called.

If it is, the printer is initialised by sending Esc @. Also the paper end detector is switched off. The codes for these two operations are held at location *intab* and can be altered if required.

The bulk of the program is concerned with printing and selecting highlight codes. The routine *char* is called with the code of the character to be printed in the accumulator.

Line 310 checks to see if the character code is less than 128; if it is the character is a normal printable one, and control is passed to *norm*.

This replaces any £ with a space (the pad character facility) and sends the character to the screen and the printer.

If the character code lies

between 128 and 135 this signifies a highlight command. Codes greater than 135 are ignored.

128 is subtracted from the code to give a value between 0 and 7. Line 340 then multiplies this value by 8 to index into the printer control code table stored at line 770.

Each of the lines 770 to 840 contain four bytes, one line for each highlight. Esc code &1B is omitted since the routine assumes that all highlights are Escape code sequences.

It is necessary to have some means of knowing whether a highlight is currently on or off.

This information is con-

tained in a single byte, labelled *buffer* in line 710. Each of the 8 bits in this byte corresponds to one highlight; 1 for on and 0 for off.

All printers are different and yours may require different control codes to mine, so you'll need to change the codes contained lines 770 to 840.

For instance, suppose that your printer requires the sequence Esc A 0 to turn on italics and Esc A 1 to turn off italics.

First forget the Esc code, since all the highlights are considered to be Esc sequences, and convert the rest to hexadecimal Ascii codes.

So it's &41 plus either &30

to turn on italics or &31 to switch off italics.

In the control code table &FF means the next two bytes switch the effect on and off so the data would be &41,&FF,&30,&31.

In assembly language this translates to EQU D &3130FF41. Notice that the four bytes following EQUD are written in reverse order. You would replace line 790 with:

790 EQUD &3130FF41

That's about it. Remember to type the program in very carefully, and with a bit of practice you'll be producing professional documents with varied type styles.

```
F11.....#.....#.....#.....#.....#.....#.....#.....#
The View printer driver generator is first loaded from disc or tape then
the text can be loaded or typed in.
...
This is an example of normal text. To print underlined
text you need to insert highlight 1 by pressing Func#8
just before the text and again at the end. This next
piece of text is underlined.
Normal text. The underlined text is bold. Bold
text is produced with Func#3 like EQU D FF30 and
the text between the markers will be printed in bold.
To use one of the other highlights you need to change the
code produced by Func#8 or Func#9. Press /func#0, type HI
followed by Return and enter 1-155 like:
HT 1 125
Now Highlight 1, (Func#8) will produce code 125 which
is enlarged print. This is enlarged and this is normal.
...
Of course you can do the same with highlight 2, (Func#9) as well,
which can be changed as often as necessary to produce the required style of
text.
*****
```

Figure 1: The View editing screen showing highlights

10 REM View Printer	260 .proff LDA #3:JSR os	498 JMP finish	730 .xbuf EQU D
28 REM Driver	wrch	500 .ok JSR send	740 .ybuf EQU D
30 REM By Ian Brown	278 RTS	510 INX	750 .intab EQU D &381B481
40 REM (c) Electron User	280 .char STA abuf	520 JMP loop	8
50 :	298 STX xbuf	530 .norm CMP #96:BNE n	760 .table \printer code
60 oswrch=&FFEE	308 STY ybuf	otpad	5
70 osascii=&FFE3	310 CMP #128:BM1	540 LDA #32	770 EQU D &0001FF20 \HT 12
80 DIM B1\$100	320 CMP #136:BPL	550 .notpad JSR osascii	8
90 FOR I=4 TO 6 STEP 2	330 SEC:SBC #128	560 .finish LDA abuf	780 EQU D &004645FF \HT 12
100 PI=&400	340 ASL A:ASL A	570 LDY ybuf	790 EQU D &003534FF \HT 13
110 D1=0%	350 TAX	580 RTS	800 EQU D &004847FF \HT 13
120 COPT I	360 LDA #27:JSR s	590 LDA #1:JSR os	1
130 .print JMP char	370 .loop LDA table,X	600 wrch	810 EQU D &00004645FF \HT
140 .on JMP pron	380 BPL ok	610 PLA:JSR oswrc	132
150 .off JMP proff	end	620 h	820 EQU D &00120FFF \HT 13
160 .micro JMP ret	370 .loop DEY:BM1 out	630 RTS	830 EQU D &005040FF \HT 13
170 .option JMP ret	380 ASL A	640 .flag LDY #8	840 EQU D &0001FF57 \HT 13
180 .pron LDA #2:JSR os	390 INX	650 BIT buffer:BE	5
wrch	400 LDA abuf:SEC:	660 over	850]
190 LDA init:BNE	SBC #128	670 INY	860 NEXT
ret	410 TAY:LDA #1	680 ED0 buffer:ST	870 FOR b1=0 TO (Q%+FF)
200 LDY #8	420 .vloop	690 A buffer	:7b1=0:NEXT
210 .xloop LDA intab,X:J	430 JSR flag:BEQ	700 TYA	880 OSCLI"SAVE GLP "+STR\$
SR send	440 switch	710 .init EQU D	"Q%" +108"
220 INX	450 .out	720 .buffer EQU D	
230 CPX #4:BNE xl	JSR flag:BEQ	730 .abuf EQU D	
oop	460 INX	740 JSR send	
240 INC init	470 .switch LDA table,X		
250 .ret RTS	480 JSR send		



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NEWSLETTER

Help for the Boat People

MICROLINK is being used to bring hope to thousands of distressed Vietnam refugees living in the UK.

Their plight largely ignored, these former Boat People have become a forgotten multitude of have-nots crowded into substandard dwellings.

Their families are dispersed and they are unable to find work or obtain help from social agencies because of language difficulties and their ignorance of "the system".

But now MicroLink's telex and electronic mail services are easing cases of hardship by speeding the reunification of families and smoothing their path into Western society.

Many former Boat People are suffering because when they arrived in Britain the

authorities assumed that being Vietnam refugees they were automatically Vietnamese.

In fact three-quarters of them were ethnically Chinese, speaking only a form of Cantonese and unable to understand the Vietnamese instructors hired to teach them English.

As a result they were classed as incapable and illiterate and many suffered severe psychological problems as a result of their failure to adapt to British society.

Because of their inability to communicate they could not even obtain adequate help from social agencies and hundreds ended up in squats and dingy hostels.

Shunned by the ethnic Vietnamese, and even UK Chinese communities,

because they were considered inferior, the former Boat People faced a bleak future.

But a Chinese Vietnamese Advice Centre staffed by voluntary social workers has been opened in London to help them, and it is using MicroLink in its efforts.

Af Jackson, one of the volunteers, said: "MicroLink's facilities will enable us to establish better communications with refugee agencies all over the world – particularly Hong Kong – and put dispersed families in touch.

"As well as the reunification of families, our work is concerned with improved housing for the refugees and their integration into UK society, for instance helping them set up in business".

CLIFF IS STILL TOPS

DESPISE what some critics might say the top show in London is the Cliff Richard musical.

At least that's the verdict of MicroLink subscribers according to the volume of bookings placed through TheatreLink, which is operated in association with renowned theatrical agency Edwards & Edwards.

Although Time has been panned by some of the critics it beats the long-running hit musical Cats into second place in the MicroLink theatre-goers' Top Ten.

In third place comes Me And My Girl – another of the eight musicals in the popularity list – followed by 42nd Street, with Starlight Express in fifth place.

Another target for the critics, Mutiny!, comes sixth followed by perennial favourite thriller The Mousetrap and the comedy hit Run For Your Wife.

Here's YOUR chance to join MicroLink

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Commonwealth link?

MICROLINK has been chosen as a potential medium of communication between the Commonwealth Secretariat in London and the organisation's 49 member countries.

A project is underway to assess various electronic mail and telex options in conjunction with the Secretariat's planned expansion of its computer facilities.

The aim is to improve the speed and efficiency of links between member countries and also with international

bodies like the United Nations' agencies and the World Bank.

The Commonwealth's own specialist databases will also be set up as part of the project which is expected to be completed in about two years time.

"MicroLink is one of two systems we are experimenting with at the present time", said Commonwealth Secretariat computer manager Peter Windle. "We have been impressed by its user-friendliness and ease of use".

DMP 2000

**Just the ticket for
your Electron, and
the price is right**



Product: Amstrad DMP2000
Price: £159.95
Supplier: Amstrad, 169 Kings Road, Brentwood, Essex CM14 4EF. Tel: 0277 230222

By DAVE BERTENSHAW

THE Amstrad DMP2000 is a neat front-loading printer in matt black plastic, with a removable smoked plastic cover.

On the right hand side of the sloping fascia is a column of three buttons. On Line, Form Feed and Line Feed.

There are also three indicator lights, for On Line, Paper Out and Power On.

When the printer is switched on there is a brief pause while the printer head sets itself up, then the On Line light comes on indicating that it is ready to receive from the computer.

Other controls include a paper depth indicator and the Friction/Tractor feed switch.

The accompanying manual is very clear on setting-up

procedures, and I met no difficulty in preparing it for use.

The ribbon is easy to fit and you don't get your hands covered in ink doing it, either.

Replacement ribbons appear easily obtainable and cost £5.70.

Paper is easy to load. It is fed in from the front and kept flat, an arrangement I like, especially with sheet paper.

To connect it up to the Electron you will need both an interface such as the Plus One, and a Centronics lead as well as the one supplied with the printer does not fit the Plus One.

After a problem-free assembly came the big moment, my first words in print.

This was surprisingly easy after all the horror stories you hear about printer manuals written in Japanese English for

obscure Basics.

The DMP2000 was designed for use with non-Amstrad computers, and each instruction is repeated four times, in Amstrad, Commodore, Microsoft and (most important of all) BBC Basic.

Also the English is the sort the Queen would recognise.

A simple matter of VDU2 to send information to the printer, PRINT "HELLO", and there it was, in black and white, my first masterpiece.

The DMP2000 comes equipped with six typefaces: Standard (or Pica), Mini (or Elite), proportional, condensed, near letter quality (NLQ) and NLQ proportional.

To these can be added a variety of options - double-strike, subscript, superscript, bold and italic, although not every option can be used with every typeface. For instance,

NLQ cannot be used with italic.

However, every option can be used with doublewidth and/or underline.

Choosing the typeface option is done via control codes and is, as far as I can tell, completely Epson-compatible (which means that the printer can be used with a variety of commercial software using the Epson standard).

So to choose the double-width option you would use VDU2,1,2,7,1,ASCI("W"),1,1.

This may look complicated but you soon get the hang of it, and the manual gives plenty of help.

My wife teaches French and German, so one feature we have found very useful is the ability to use foreign character sets.

This can be done either by using the control codes or by altering the DIP switches. These tiny switches are recessed into the back of the printer and can be set to choose the power-up state of the printer.

They can be used to select various functions so that you don't have to be constantly using the control codes.

By setting these switches - again clearly explained in the manual - then switching on the printer, you can change the character set to one of nine. This means that you can print French with acute accents, German with umlauts and so on.

The drawback is that these new letters occupy Ascii codes

This is STANDARD typeface, which can be made **bold** or **italic** or even **bold italic doublewidth underlined subscript and superscript**.

What about condensed italics, or doublestrike?
You can have MINI or PROPORTIONAL
and for those important letters Near-Letter-Quality (NLQ)
or, to crown it all, NLQ PROPORTIONAL!

There are more than 100 different print options

Mon père, mon postillon a été frappé par un éclair à Alençon.

Das schöne Fräulein ist viele Käse in der Küche.

And the script can be French or German or...

From Page 27

normally used by other symbols, such as the curly bracket. You therefore have to get used to typing words like tr̄s, but this is easily learnt.

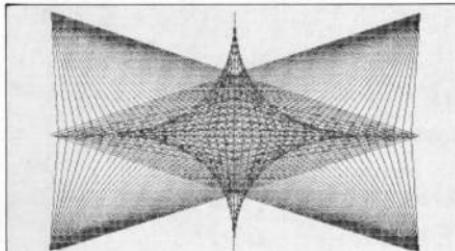
Obviously, the difficulty is only apparent on the screen – the printer spews out perfect French.

One anomaly is that there is no symbol for the circumflex accent. This could prove to be a nuisance.

Only you can decide whether a circumflex accent is worth the extra cost of buying a printer with the full international character set.

There are various graphics options, including single, double and quadruple density modes.

Needing a screen dump I called upon my vast reserves of programming experience. That is I looked through my back issues of *Electron User* until I found Roland Wadilove's article "What a



A Mode 1 screen dump

dump!" (March 1985).

The machine code version of this works perfectly without alteration.

I have only two slight moans about the DMP2000. The first is that there is no tear-off arrangement for tractor paper, which is annoying.

The second is not really Amstrad's fault at all. I use View as my word processor and the big flaw in that, as reviewers have pointed out, is

that none of the printer's effects is available unless you buy the View Printer Driver.

The version I have seems to be out of date, because while it works well with underline, bold, doublewidth and subscript, there is no way of accessing the other facilities from within View. Fortunately the driver listed in this month's issue can cope.

You can set NLQ, condensed and bold using the DIP

switches, but this is unnecessarily complicated.

The DMP2000 has many more features than can be included in this review. Suffice it to say that through the control codes you have access to a wide range of options as to page length, vertical and horizontal TAB settings and paper feed rates and direction.

As you have probably guessed by now, I am very impressed with the DMP2000. The print quality is very good (NLQ is excellent), the workmanship of the printer is without fault and above all the price is very interesting indeed.

All these qualities set me back under £160, at least £60 less than the Epson LX80 reviewed in the February 1986 issue of *Electron User* and I didn't pay extra for the tractor feed.

All things considered, Amstrad are to be congratulated on producing the right features at the right price.

ADVENTUROUS PEOPLE LOVE ROBICO



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"We turn dreams into reality!"

MYTHS abound in the world of computers and education. Many parents helped to fuel the computer boom a year or two ago acting on the belief that any teenager who sat at a computer became a programmer.

The sky was the limit for these people. At the very least, a good job was a certainty and large numbers of youngsters could earn £50,000 a year by the time they were 16.

In fact, of course, the number of highly paid whiz kids was very limited and, sadly, unemployment has continued to rise.

Even so, all sorts of parents still felt that the ability to use, and in particular program, a home micro is a passport to a successful career.

The baffling thing for such parents was that schools did not seem to have got the message.

In secondary schools programming, if taught at all, was reserved for a small number of 15 and 16-year-old boys. For the younger boys and all girls, computers were mere tools using pre-written programs.

If so many parents thought and still think that programming skills are important, why is it that schools ignore them?

There are a number of reasons, but perhaps most important is that there are many different languages.

Basic (Beginners All Purpose Symbolic Instruction Code), is just one language, and in terms of the real world it is of minor importance.

Even Basic appears in dozens of different versions. These are usually called dialects and different computer designers seem to have their pet versions.

Schools can't really cope with the problem of different languages and dialects.

For instance, the Electron and Spectrum have different dialects and a program written in Basic for one machine has only a limited chance of running on the other.

So a school working in Electron (BBC) Basic would give only limited value to Spectrum owners, and no value at all to industry and commerce.

In practice suitable people can be trained quickly in a particular language, which

Overcome language barriers

might be Fortran, Cobol, Pascal and so on as and when needed.

Despite this many teachers and educationalists think that programming has value and may do some teaching of the required processes as a club activity. All sorts of skills can be enhanced by getting to grips with the micro.

One of the present fashions in education is problem solving. Put crudely, a teacher might give the pupils a task such as making a bridge out of straws. The materials available would be specified and pupils will attempt the task and learn from successes and failures.

Programming a computer can be a problem solving exercise. The task could range from writing your name all over the screen to producing an arcade adventure of the city Citadel. No matter

what the problem, solving it can be a valuable learning activity.

One of the skills gained is the ability to use the computer language, but perhaps more important is the ability to specify and analyse a situation, consider various solutions and select the best.

It's not all that different from coping with life, is it?

One of the main reasons that people choose the Electron is because it has a good version of Basic and is fairly easy to program.

(The adverts always stress that by getting an Electron you're getting the same version of Basic that most school computers use.)

Most children find programming hard though, even on the amazing Electron.

The chief difficulty that would-be young programmers

encounter is "What should I program?" Often they do not have a problem they wish to solve. Sometimes tied up with this is the thought that "Any program I write will be boring".

Almost as an afterthought comes the second area of concern. This applies to virtually any piece of complex equipment, be it computer, printer or household appliance – the instructions in the user guide are incomprehensible.

A helpful adult can earn his or her keep in overcoming the first problem.

Such an adult needs to be able to create an unlimited supply of challenges to be solved and dole out encouragement, congratulations and constructive criticisms.

Let's look first at creating programming tasks. There's no point trying to get a child to program at home if the idea does not appeal.

The majority of youngsters are happy to generate graphic displays. Most people seem to think that graphics are difficult, but in fact it's easy to draw using BBC Basic.

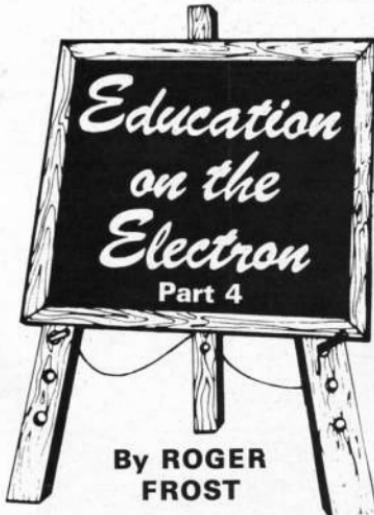
Children at school learn about graph paper and coordinates from very early ages. The two keywords MOVE and DRAW, along with the idea that the screen is a grid, can get youngsters started.

A task such as drawing your own house will not prove beyond most secondary children and it will soon have them seeking for more information such as "How do I change colours?" or "Can I fill in whole areas?"

It's possible that some children will realise that drawing four identical windows, all with separate code, is absurd. Such a child now has the need for subroutines or procedures within programs.

So from a simple idea a youngster can develop in his or her own way and can also learn that the first idea he or she thought of is not necessarily the best solution.

A difficulty about graphic programming is that some younger children can't cope with the large numbers. The screen grid of 1280 by 1024 has over a million locations to



From Page 29

keep track of.

I have found that a scaled screen can make life a lot easier. Addcomm, from Vine Micros, has a scale command which allows you to redefine the screen grid in any way you care to.

A 10 by 10 grid is simple enough for juniors and some infants though it wouldn't satisfy the more meticulous, older child who wants accuracy.

Another way of helping younger children is to write a set of graphic procedures - circle, square, triangle and so on - which can be called up easily. You do the main coding, leaving the child to solve the problems.

When it comes to encouragement and criticism, don't expect your child to produce perfection. Try to encourage them to improve screen layouts.

You don't need to be a programmer yourself to offer

artistic advice. For instance, programs with text in should not have a word split between two lines. Gently persuade youngsters that they can get it right and they will.

The second area of concern for the programmer is the quality of the user guide. There is no escaping that learning Basic can be a bit of a graft.

The problem solving approach to programming means that new ideas and keywords are discovered only when they are required.

There seems very little point in ploughing through a book and learning about keywords that are virtually never used.

The Basic word ATN is a good example. No doubt it has some uses, but the vast majority of learner programmers will just be confused by the user guide's nearly incomprehensible definition.

What is really needed is an easy-to-read, well organised and coherent book of Basic. For the under elevens, I would

suggest something from the Usborne range.

These books are cheap and cheerful and make a real attempt to make a complex subject simple. Each book may have a specific purpose, such as writing adventure programs or logic games.

They are not Electron books though, being written to cover some of the lesser computers as well.

This means that some of the demonstration programs do not make the best use of the Electron's facilities.

At the next level, a very readable guide is Getting Started in BBC Basic by Mike Bibby, available from Database Publications.

This tutorial-style book starts at the very beginning and could lead an enthusiastic teenager up to a good standard of programming.

An extremely good method of discovering how to code Basic is to look at the listings of programs which do something similar to what is required.

This can point a youngster to particular keywords which might be useful and further research can be done on those words.

Learning Basic then, is not essential for life in the 1980s, but as a problem solving exercise it can have numerous benefits.

It may not actually help children with school work, but hopefully they will learn that with a bit of effort in planning and research difficulties can be overcome.

Almost as an afterthought comes the fact that programming can be immense fun and very satisfying.

One final comment. Programming is actually alive and flourishing in primary schools. Basic is not used, because for all manner of reasons Logo is preferred.

We'll look at Logo on another occasion, but next month will feature an educational use for spreadsheets that could also save you some money too.

QUAL-SOFT

THOUGHTWARE

Sports simulations

"MEXICO '86 is an excellent simulation that will challenge all budding managers".



NOVA (Nova rating: "You should immediately rush out and buy it").

Value for Money

**TAPE 1
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Summer 1984 and English International football is at its lowest ebb. We have failed to qualify for the European Nations Cup, and had a string of very poor International results. In a few months we will set out on the '86 World Cup qualifying trail. You have been given the most important job of restoring English pride in their football. You have a match in Paris, the USSR at Wembley, and a South American tour, to assemble a team, first to qualify, and then to beat the world's best in Mexico.

TAPE 1 (Qualifiers)

- ★ Current squad of 16 players - 20 user defined players.
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- ★ ANY team formation you choose. 2 from 5 substitutes.
- ★ In match tactics: any no. of individual player adjustments.
- ★ Your qualification group: full results and table.

TAPE 2 (Finals)

- ★ Choose a 20 man squad to take to the finals.
- ★ Group of 4 prelims, 16 to final knockout comp.
- ★ Extra Time, PENALTY SHOOT-OUTS, where relevant.
- ★ Formation and strength information on opposition.
- ★ 2 from 9 substitutes (the FA tells us so).

COMPUTER
GAMER
JUNE 1986

**TAPE 2
FINALS**

THE ONLY ELECTRON SOCCER MANAGEMENT SIMULATION WITH SOUND AND GRAPHICS

QUAL-SOFT comments: With 5 levels of play, 12 depths of sophistication, and "fun" graphics, this game can be enjoyed by an 8 year old youngster as a "fun" game, and by the most sophisticated as a tactical/strategy challenge of the highest order.

PACKAGE: Tape 1 plus Tape 2, plus 20 Page Manual in "Video Cassette" style pack. Only £9.95 (157K RAM usage. Some would call this a MEGAGAME) YES IT WILL RUN ON YOUR 32K ELECTRON.

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* The use of the name MEXICO '86 does not imply any association with FIFA

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Electron
BBC 'B'

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HELP! It's the morning after the night before, and you've just woken up with a terrible hangover to find yourself trapped in a maze of lookalike twisty turny passages.

It must have been a good party, as you can't remember a thing, not even how you got here.

Can you find your way out or are you doomed to wander these corridors till the end of time?

You can see 1/49th of the maze, displayed in 3D, but if you can find it there's a map showing you the way out.

Unfortunately it's in the form of a large keyhole and you'll need the keys to get through. You'll find them scattered throughout the maze.

The keeper of the maze resents your intrusion into his property and is hot on your tail and after your blood. Don't let him catch you!

There are three different mazes and you start off in the first with two keys to collect. The number needed increases with every maze and the keeper gets meaner and faster.

The controls are: Z=left, X=right, =up, ?=down.

When typing in Maze don't enter any unnecessary spaces — and this includes the one after each line number — or you'll run out of memory.

MAZE

By STEPHEN MERRIGAN



PROCEDURES

assemble Assembles the machine code.
ins Prints the instructions.
var Sets the variables.
level Increases the level.
draw Draws the screen.
map Draws the map.
key Places the keys at random.

VARIABLES

sc% Score.
l% Lives.
mazey% Current maze.
HI%() High scores.
HI\$() Names for high scores.

**Full listing starts
on Page 56**

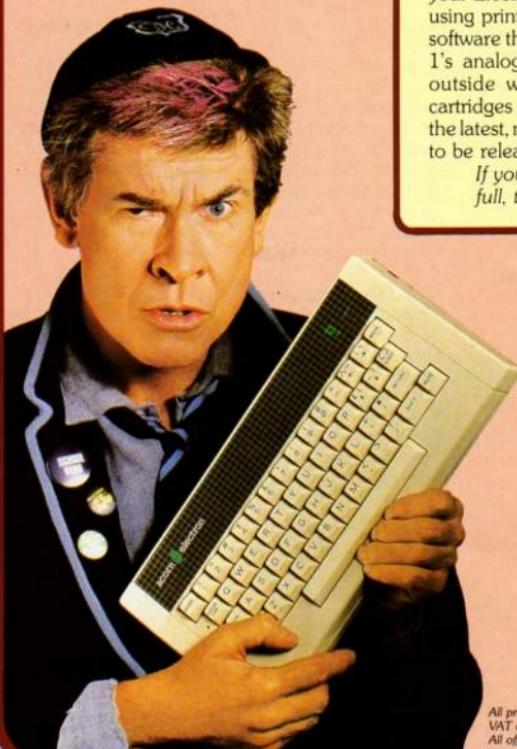


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Electron User

£82.80

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Normal price £119.80

Electron User

£119.80

All prices include
VAT and carriage.
All offers subject to availability.

Please use the order form on page 102.



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on Page 53

EXPAND - with the under-£100 Plus 3!

The Plus 3 expansion unit provides you with a disc drive and disc interface in one compact unit. It consists of a single sided 80 track drive and ADES, and can store up to 320k of data on each 3jin disc with no limit to the number of files. Expansion ports at the rear of the unit enable a Plus 1 to be added and a second drive can be attached which can be either 5jin or 3jin, 40 or 80 track.

The Plus 3 comes complete with a Welcome disc packed full of games, demonstrations, utilities and help files, plus a 111 page manual containing everything you need to get you started right away.

Normal price £219.00

Electron User price £99.95

... or a Plus 3 PLUS Database!

Bring the speed of discs and the organised memory of a powerful database to your Electron with the Electron Database combined with the Plus 3 disc drive, this dynamic duo should provide the answer to all your dataprocessing needs.

The database has all the facilities any normal user, home or business, would need. Yet - thanks to its menu-driven structure - it's simplicity itself to use. Records can be as varied as you require: You can have up to 22 fields ranging from 2 to over 200 characters in size. Once you've entered the records, information can be recovered with the minimum of fuss, sorting and searching over any number of fields. And when you've created your record structure you're not stuck with it: Field sizes can be changed at will. So, if you're interested in keeping records, do yourself a favour: Upgrade to the Electron Database and let your micro do the work.

Normal price £248.95

Electron User price £114.95



WORN OUT with wordprocessing?
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OPPRESSSED with machine code?

Then you need...

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Volume 1 contains:

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Play a round by yourself, or play against your pals.

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Fight against all the odds to get out alive.

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Another classic. Help the spacemen avoid marauding monsters.

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Help Parky through an invisible maze, racing against time.

Rally Driver

All the thrills of high-speed driving, with none of the risks.

Alphasweat

Your letters are in a twist. Can you put them in order?

Knockout

Fast and furious action as you batter down a brick wall.

Money Maze

Avoid ghosts and collect coins in an all-action arcade classic.

Lunar Lander

The traditional computer game specially written for the Electron.

These two cassettes are not only crammed with 18 of the best games from the early days of Electron User. At no extra expense, we've included on each an unpublished Roland Waddilove machine code masterpiece as a freebie. Roland's Jam Butty and Atom Smash are arcade action at its fastest and most frustrating. And they're only available with Ten of the Best. So give yourself a treat... with the most popular cassettes we've ever produced.

Volume 2 contains:

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Machine code thrills as you help to save the world from destruction.

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Go egg collecting, but keep away from the proliferating rabbits.

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Build castles - but beware the rising tide and hungry sandworms.

Reaction Timer

Test your reactions with this traffic lights simulation.

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The Electron version of the age-old game of logic and patience.

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Jump for your life in this exciting arcade action game.

Break free

Test your wits and reflexes in this popular classic ball game.

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Crack the code in a colourful if frustrating brainteaser.

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Solve the plunging sky divers from a watery end.

Star Fighter

Attack the bandit ships in this fast-moving 3D punch-up.

ONLY
£5.95
each

TO ORDER, PLEASE USE THE FORM ON PAGE 53

TEXTED is a simple text editor which will enable you to write short letters, documents and articles on your Electron and print them out using a suitable printer.

It's simple, easy to use and ideal for quick notes.

Although not a full blown word processor, it does have some useful features and you should find it adequate for fairly straightforward tasks.

There's about 11k of memory free and all text is printed out with word wrap. (Word wrap means that if it won't split a word over two lines, it takes it down to the start of the next).

When you run TextEd, after a short pause you'll see a menu with a list of nine options to choose from.

The first option is to enter edit mode to input text. The editor is always in overwrite mode, so whatever you type in overwrites any text already on the screen.

This is not a WYSIWYG (What You See Is What You Get) type of word processor. The screen may look very untidy at times but the print routine sorts everything out, adding tabs, carriage returns and word wrap.

This isn't unusual by any means - Mini Office does the same - and you'll soon get used to it.

The cursor can be moved anywhere on the screen using the cursor keys and then text is entered. When the cursor hits the bottom of the screen using cursor down, the screen will scroll up so you can enter more text.

You can get back to the start of the text by holding down cursor up. When the cursor hits the top of the screen will scroll down.

The line number of the bit of text at the top of the screen is printed in the top left corner so you can see where you are in the document or letter.

The Return key takes the

Line:000 Esc=Menu
TextEd is a simple text editor which will enable you to write short letters, documents and articles on your Electron and print them out using a suitable printer. It's simple, easy to use and ideal for quick notes. It's not a full blown word processor but it does have some useful features and you should find it adequate for fairly straight forward tasks. There's about 11k of memory free and all text is printed out with word wrap. (Word wrap means that it won't split a word over two lines, it takes it down to the start of the next). When you run TextEd, after a short pause you'll see a menu with a list of nine options. I'll go through these ■

f8=CR f9=LF f10=insert f3=remove

TextEd

ROLAND WADDILOVE offers a useful text editor that will convert your computer into a versatile electronic typewriter

cursor to the start of the next line and Delete backspaces and deletes as normal.

To start a new line or paragraph you enter a carriage return by pressing function 0 - it looks like a bent arrow on screen.

Note that this does not start a new line on the screen, it only comes into effect when you print the text. There's no need to move to the start of a new line on the screen.

Carry on typing straight after the carriage return.

Function 1 enters a Tab character which is equivalent to inserting five spaces. It looks like a right arrow on screen and is useful at the start of new paragraphs.

If you forget something and want to insert a word in the middle of the text press function 2. This inserts spaces at the cursor position shuffling

text along which you can then overwrite as normal.

To remove text without inserting spaces press function 3.

To return to the main menu from edit mode press Escape.

Option 2 is to print the text. Always set up the printer before running TextEd as you can't alter the style halfway through a document. You can set NLQ mode or double space or whatever you want, then load and run TextEd.

First you'll be asked for the line length. This is how wide the text is when printed.

Next, input the width of the left margin. It's up to you to make sure that the printer can cope with the figures.

Entering a line length of 80 and a margin of 10 when the printer can only print 60 columns will not produce neatly formatted text. Press

any key to abort printing.

Option 3 is to load a text file. Remember that any text currently in the memory will be lost. If you don't enter a filename TextEd assumes that you don't want to load anything, so it won't erase the old text. It's an escape route in case you select this option by mistake.

Option 4 is to save the text, and option 5 clears all the text so you can start afresh.

Options 6 and 7 allow you to select tape or disc to load or save a file. If you haven't got discs nothing will happen.

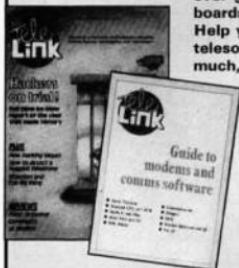
Option 8 will catalog the tape or disc depending which has been selected. If it's tape you'll need to press Escape when you've finished.

Option 9 exits from TextEd and returns you to Basic. Your

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text is still in the memory, stored above HIMEM though, so if you're in the middle of a document and want to know what 27 x 56 is you can leave TextEd, type in the calculation, enter RUN and carry on where you left off.

A word of caution – anything which alters HIMEM will destroy the text.

TextEd is written almost entirely in machine code, so be careful when entering it. Unless you're an experienced Electron user I would suggest getting the monthly tape, as finding typing errors in an assembly listing isn't easy.

If you do decide to have a go at typing it in save it before running as it deletes all the assembly listing, leaving just a few lines of Basic.

It should be quite easy to add extra features such as merge two files, search and replace, or even a spelling checker. I'll leave that up to you though.

Texted listing

```
10REM **** TextEd *****
20REM By R.A.Waddilove
30REM (c) Electron User
40REM ****
50REM #If you renumber#
60REM #this program it#
70REM + won't work!
80REM ****
90MODE 6:HIMEM=5$800
100PRINTTAB(10,10)
110ON ERROR RUN
120PROCInitialise
130REPEAT
140PROCmenu
150IF K1=1 PROCedit
160IF K1=2 PROCPrint
170IF K1=3 PROCload
180IF K1=4 PROCsave
190IF K1=5 PROCclear
200IF K1=6 THEN #TAPE
210IF K1=7 AND PAGE<1ID00
THEN #ADFS
220IF K1=7 AND PAGE>1ID00
THEN #DISC
230IF K1=8 THEN OSCLI*FX2
29*:OSCLI*CAT:a$=GET$*
240UNTIL K1=9
250CLS
260END

270
280PRINT TAB(10,5)*** PR
INT TEXT ***TAB(10,10)"Lin
e length ":"INPUT L1:L1=ABS
(L1)MOD12
300PRINT TAB(10,10)SPC(40
)TAB(10,10)"Margin ":"INPUT
M1:M1=ABS(M1)MOD50
310PRINT TAB(10,10)SPC(40
)TAB(10,10)"Please wait";
320I1=45FF:J1=text+40:RE
PEAT I1=I1-4:UNTIL I1>20
2020 OR IX>IX=IX+4
330PRINT TAB(10,10)"Press
space to print":#FX21
340IF GET$="" ENDPROC
350J1=text:a$=""#VDU12,2
360REPEAT
370PRINT SPC(M1);
380REPEAT
390I1?J1=128 a$=a$+CHR$1
3
400IF J1=129 a$=a$+"
410IF J1<127 a$=a$+CHR$?
J1
420JI=JI+1
430UNTIL LEN a$>L1
440AIX=L1
450BIF MID$(a$,A1,1)<>" "
AND A1>2 A1=A1-1:GOTO 450
460BIF INSTR(a$,CHR$13) PR
INT LEFT$(a$,INSTR(a$,CHR$1
3)-1):a$=MID$(a$,INSTR(a$,C
HR$13)+1) ELSE PRINT LEFT$(a
$,A1):a$=MID$(a$,A1+1)
470UNTIL J1>IX OR INKEY$#
<>"
480VDU0 J
490PRINT ""Press a key":#
#FX21
500a$=GET$
510ENDPROC
520
530DEF PROCclear
540PRINTTAB(5,5)"Are you
sure you want to"TAB(9,7)"c
lear the text":#FX21
550IF INSTR(" Y",GET$)>1
CALC C1:#ptr=text?x@:?y@
1?:line@:#top_line=text
560ENDPROC
570
580DEF PROCsave
590PRINTTAB(10,5)*** SAV
E TEXT ***TAB(10,10)"Think
ing";
600I1=45FF:J1=text+40:RE
PEAT I1=I1-4:UNTIL I1>20
2020 OR IX>IX=IX+4
610PRINT TAB(10,10)SPC(15
)TAB(10,10)"Name ":"INPUT n
ame$name$=LEFT$(name$,10)
620IF name$="" ENDPROC
630#FX229
640OSCLI*SAVE "+name$+" "
+STR$text+" "+STR$#IZ
650ENDPROC
660
670DEF PROCload
680PRINTTAB(10,5)*** LOA
D TEXT ***TAB(10,10)"Name
":INPUT name$name$=LEFT$(n
ame$,10)
690IF name$="" ENDPROC EL
SE CALL C1:#ptr=text?x@:?y@
y@:#line@:#top_line=text
700#FX229
710OSCLI*LOAD "+name$+" "
+STR$text
720ENDPROC
730
740DEF PROCmenu
750#FX229,1
```

***** T E X T E D *****

1. Edit the text.
2. Print the text.
3. Load new text file.
4. Save current text.
5. Clear all text.
6. Select tape filing system.
7. Select disc filing system.
8. Catalog disc/tape.
9. Exit from TextEd.

Press a key

TextEd is a simple text editor which will enable you to write short letters, documents and articles on your Electron and print them out using a suitable printer. It's simple, easy to use and ideal for quick notes.

It's not a full blown word processor but it does have some useful features and you should find it adequate for fairly straight forward tasks. There's about 11k of memory free and all text is printed out with word wrap. (Word wrap means that it won't split a word over two lines, it takes it down to the start of the next).

When you run TextEd, after a short pause you'll see a menu with a list of nine options. I'll go through these

Sample printout using TextEd

Texted listing

From Page 37

```

76BVDU26,12:PRINTTAB(5,1)
***** T E X T E D *****
77B$RESTORE7B0:FOR IX=1 TO
9:READ a$:PRINTTAB(5,2+IX*2);IZ;."."NEXT
78B$DATA Edit the text,Pri
nt the text,Load new text f
ile,Save current text,Clear
all text,Select tape filin
g system,Select disc filing
system,Catalog disc/tape,E
xit from TextEd
79B$PRINT TAB(10,23)*Press
a key*:;VDU 23,1,1;0;0;0;;
#FX21
80B$REPEAT KX=GET-49:UNTIL
KX>0 AND KX<10:CLS
81B$ENDPROC
82B
83B$DEF PROCredit
84BVDU 23,1,0;0;0;0;
85B$COLOUR129:COLOUR0:PRIN
TSPC(40)TAB(1,24)* f0=CR f
1=TAB f2=insert f3=remov
e ";":COLOUR128:COLOUR1:PRIN
TTAB(1,8)*Line:"TAB(31,8)"E
sc=Menu"
86B$CALL T%
87B$ENDPROC
88B
89B$DEF PROChinitialise
90BVDU15
91Ba$=STRING$(255,"*")
92Fa$#F1225,128
93Bf Fx=a12345678 F1=0:F
ORIX=TO #48B$PTEP4:I#X$308
B=IX!#5800:NEXT:CALL CX:REM
Move code+clean_text
94Bptr=&70:z=&72:y=&73:li
ne=&74:top_line=&75:text=&7
48I
95B:ptr=text:z=0?y=1?i=1?
ine=0?:top_line=text
96B$ENDPROC
97B
98B$DEF PROCCassemble
99B%F=0:#KEY DEL,30,100:
MDEL,978,5800:MH=&3000:MRU
NIM
100B$FX16
101B$FX4,1
102BVDU 19,8,4;0;0;28,18,2
,39,8
103B$PRINT "*** TextEd ***"
***"Assembling code"
104BVDU 23,128,6,6,38,78,2
54,252,64,32:REM CR
105BVDU 23,129,8,12,6,254,
254,6,12,8;REN TAB
110B$osrdrch=&210 AND &FFFF
:oswrch=&A20E AND &FFFF:osb
yte=&20A AND &FFF
111B$text=&3401:text_end=&5
FFF:maxline=255
112Bptr=&70:z=&72:y=&73:li
ne=&74:top_line=&75:icount
er=&77
113Btemp=&78
114BFOR pass=4 TO 6 STEP 2
115BPX=&3000:01:HIMEM
116B$OPT pass
117B.TX \texted
118B$JSR window:LDA #12:JSR
oswrch:LDA #26:JSR oswrch
\CLS window
119BJSR line_number
120BJSR print_screen
121B\-----
122B.main_loop
123B$LDA #1(main_loop-1)DIV2
56:PH$HAI(LDA #1(main_loop-1)MO
D256:PHA \return address
124BJSR cursor_on
125BJSR osrdrch
126B$CMP #27:BNE a7:PLA:PLA
:LDA #126:JMP osbyte \Escap
e
127B,w7 CMP #127:BNE a1:JM
P delete
128B,w1 CMP #136:BNE a3:JS
R cursor_off:JMP xleft
129B,w3 CMP #137:BNE a4:JS
R cursor_off:JMP xright
130B,w4 CMP #138:BNE a5:JM
P cursor_down
131B,w5 CMP #139:BNE a2:JM
P cursor_up
132B,w2 CMP #32:BCC a6:JMP
#882:BCS a6:JMP valid_char
133B,w6 CMP #882:BNE a8:JM
P return
134B,w8 CMP #882:BNE a9:JM
P insert
135B,w9 CMP #883:BNE a10:J
MP remove
136B,w10 RTS \return to wa
in_loop
137B\-----
138B.insert
139B$LDY y:CPY #23:BNE in1
\bottom line?
140B$LDX x:CPX #39:BEQ end_
insert \can't if at 39,23
141B.in1
142BJSR fx21
143B$LDA #text_end MOD256:S
145B$LDY #STA temp+1
146B$SEC:LDA temp:SBC #1:ST
A temp:LDA temp+1:SBC #0:ST
A temp+1 \temp=temp-1
147B$LDA (temp),Y:INY:STA (
temp),Y:DEY
148B$LDA temp:CMPI PTR:BNE 1
oop
149B$LDA temp+1:CMPI PTR+1:B
NE loop
150B$LDA #32:STA (ptr),Y \
insert space
151B$JSR print_line
152B$JSR inkey:BCC in1 \ke
y held down?
153B.and_insert
154B$JMP print_screen
155B\-----
156B.remove \remove space
s
157B$LDY y:CPY #23:BNE real
\bottom line?
158B$LDX x:CPX #39:BEQ end_
remove \can't if at 39,23
159B.real
160BJSR fx21
161B$LDA PTR:STA temp:LDA p
tr+1:STA temp+1 \temp=ptr
162B$LDY #1
163B.loop
164B$LDA (temp),Y:DEY:STA (
temp),Y:INY \?temp=temp-1
165B$CLC:LDA temp:ADC #1:ST
A temp:LDA temp+1:ADC #0:ST
A temp+1 \temp=temp+1
166B$LDA temp:CMPI #text_end
MOD256:BNE loop
167B$LDA temp+1:CMPI #text_e
nd DIV256:BNE loop
168B$LDY LDA #32:STA (temp)
,Y \space at end
169BJSR print_line
170B$JSR inkey:BCC real \k
ey held down?
171B.end_remove
172B$JMP print_screen
173B\-----
174B.print_line
175B$LDA #31:JSR oswrch:LDA
x:JSR oswrch:LDA y:JSR osw
rch \TAB(x,y)
210B$LDY #0:LDA (ptr),Y:JSR
oswrch \print char under
cursor
211B$LDA #17:JSR oswrch:LDA
#1:JSR oswrch \COLOUR 1
212B$LDA #17:JSR oswrch:LDA
#128:JSR oswrch \COLOUR 1
29
209B$LDA #31:JSR oswrch:LDA
x:JSR oswrch:LDA y:JSR osw
rch \TAB(x,y)
210B$LDY #0:LDA (ptr),Y:JSR
oswrch \print char under
cursor
211B$LDA #17:JSR oswrch:LDA
#1:JSR oswrch \COLOUR 1
212B$LDA #17:JSR oswrch:LDA
#128:JSR oswrch \COLOUR 1
28
213B$LDA #0:JSR oswrch \ba
ckspace
214BRTS
215B\-----
216B.scroll_down
217B$LDA line:BEQ end_scrl:
DEC line
180BINY:DEX:BNE loop
181BRTS
182B\-----
183B.return \go to start
of next line
184BJSR cursor_off
185B$LDY y:CPY #23:BEQ end_
cr
186B.loop
187BJSR xright
188B$LDI x:BNE loop \move
to start of next line
189B.end_cr
190BRTS
191B\-----
192B.valid_char
193BJSR oswrch \print cha
r...also removes cursor
194B$LDY #0:STA (ptr),Y \s
tore char
195B$JMP xright \x=x+1
196B\-----
197B.delete
198BJSR cursor_off
199B$SEC:LDA PTR:SBC #1:STA
temp:LDA PTR:SBC #0:STA
temp+1 \temp=ptr-1
200B$LDY #0:LDA #32:STA (te
mp),Y \delete
201B$JMP xleft \x=x-1
202B\-----
203B.cursor_off
204B$LDY #0:LDA (ptr),Y:JMP
oswrch
205B\-----
206B.cursor_on
207B$LDA #17:JSR oswrch:LDA
#0:JSR oswrch \COLOUR 0
208B$LDA #17:JSR oswrch:LDA
#129:JSR oswrch \COLOUR 1
29
209B$LDA #31:JSR oswrch:LDA
x:JSR oswrch:LDA y:JSR osw
rch \TAB(x,y)
210B$LDY #0:LDA (ptr),Y:JSR
oswrch \print char under
cursor
211B$LDA #17:JSR oswrch:LDA
#1:JSR oswrch \COLOUR 1
212B$LDA #17:JSR oswrch:LDA
#128:JSR oswrch \COLOUR 1

```

```

2188JSR window
2198LDA #38:JSR oswrch:LDA
#11:JSR oswrch \home+curls
or up
2208SEC:LDA top_line:SBC #
48:STA top_line:LDA top_li
e+1:SBC #0:STA top_line+1
2218LDA #26:JSR oswrch \ca
ncel window
2228_end_scrd
2238RTS
2248\-----+
2258.scroll_up
2268LDA line:CMP #maxline:
BEQ end_scrd:INC line
2278JSR window
2288LDA #31:JSR oswrch:LDA
#0:JSR oswrch:LDA #22:JSR
oswrch \TAB(0,23)
2298LDA #18:JSR oswrch \do
wn
2308CLC:LDA top_line:ADC #
48:STA top_line:LDA top_li
e+1:ADC #0:STA top_line+1
2318LDA #26:JSR oswrch \ca
ncel window
2328.end_scrd
2338RTS
2348\-----+
2358.print_screen
2368LDA #31:JSR oswrch:LDA
#0:JSR oswrch:LDA #1:JSR o
swrch \TAB(0,1)
2378LDA top_line:PHA:LDA t
op_line+1:PHA \save top_li
ne
2388LDA #23:STA counter
2398.ploop
2408LDY #0
2418LDX #48
2428.ploop1
2438LDA (top_line),Y:JSR o
swrch
2448INY:DEI
2458BNE ploop1
2468CLC:LDA top_line:ADC #
48:STA top_line:LDA top_li
e+1:ADC #0:STA top_line+1
2478DEC counter
2488BNE ploop
2498PLA:STA top_line+1:PLA
:STA top_line
2508RTS
2518\-----+
2528.xright \x=x+1
2538LDX x:LDY y
2548INX:CPX #48:BEQ xrl \
x=48
2558.xr2

```

■ Line:839 Esc=Menu ■
→ The Return key takes the cursor to the start of the next line and delete backspace and deletes as normal. To start a new line or paragraph in the document you must enter a carriage return by pressing function 8, it looks like a bent arrow on screen. Note that this does not start a new line on the screen, it only moves the cursor up so when you print the text comes out correctly. There's no need to move to the start of a new line on the screen. Carry on typing straight after the carriage return. Function 1 enters a Tab character which is equivalent to inserting five spaces and is useful at the start of new paragraphs.

```

 3:ptr:LDA ptr+1:SBC #0:STA
ptr+1 \ptr=ptr-48
2990RTS
3000,top
3018LBLDA line:BEQ end_cu \
at top of text?
3020JSR scroll_down
3038SBC:LDA ptr:SBC #48:ST
ptr:A:PTRDptr+1:SBC #0:STA
ptr+1 \ptr=ptr-48
3048LBLDA #129:LDX #0&6:LDY
#FF:JSR osbyte:TYA:BNE top
\scroll again?
3050.end_cu
3060JSR print_screen
3070JSR fx21
3080JMP line_number
3090\-----
3100.line_number
3110LDA #31:JSR oswrch:LDA
#6:JSR oswrch:LDA #0:JSR o
swrch TAB(5,0)
3120LDA line \get line nu
mber
3130LDX #100:JSR digit
3140LDX #10:JSR digit
3150LDX #1
3160.digit
3170STSX temp
3180LDX #47
3198SEC
3200.loop
3210INX
3220SBC temp:BCS loop
3230ADC temp:TAY
3240TXA:JSR oswrch
3250TYA:RTS
3260\-----
```

3270.fx21 LDA #21:LDX #0:L
DY #0:JMP osbyte \FX21
3280.inkey LDA #8B:LDX #1
0:LDY #0:JMP osbyte \INKEY(1)
18)
3290.window LDA #28:JSR os
wrch:LDA #0:JSR oswrch:LDA
#23:JSR oswrch:LDA #39:JSR
oswrch:LDA #1:JMP oswrch \
VDU 28,0,23,39,0
3300\-----
3310.CI \clear text
3320LDA #text MDD256:STA t
emp:LDA #text DIV256:STA te
mp+1 \temp{text start
3330LDY #0:LDA #32
3340.loop
3350STA (temp),Y
3360INC temp:BNE wipe1:INC
temp+1
3370.wipe1
3380LDX temp:CPX #(text_en
d1):MDD256:BNE loop
3390LDX temp+i:CPX #(text_
end+d1):DIV256:BNE loop
3400RTS
3410
3420NEXT
3430FX=l2345678:PRINT'"De
leting source"
3440#FX21
3450#FX138,8,128
3460ENDPROC

This listing is included in this month's cassette tape offer. See order form on Page 53.

FORMULA 1

LAST year I spent many an hour writing an arcade adventure called Citadel for the BBC Micro and Electron for Superior Software from my home in Denmark.

Some of the screens have several animated monsters and many complex calculations have to be done.

With the BBC Micro speed is no problem, but I was afraid the Electron version would be too slow.

This is because the Electron has slow RAM and lacks some of the dedicated processors that are found in the BBC Micro.

So it has to compensate by doing the same tasks – like video and keyboard handling – in software.

This means that a machine code program runs at half the speed of the BBC Micro in Modes 4 to 6 and is more than four times slower in Modes 0 to 2.

The only answer was to find ways of speeding up the Electron so that Citadel would be as playable as the BBC Micro version.

If I hadn't discovered the methods outlined below the game would never have been released for the Electron.

To show how easy it is to speed up the Electron enter Program I.

It takes about 6.6 seconds to execute on an unexpanded Electron and 8.9 seconds on one fitted with a Plus 1.

However if a key is pressed while the program is running the time taken is 9.4 seconds and 14.7 seconds respectively.

If you have a Plus 1 fitted

```
10 REM PROGRAM I
20 MODE2
30 TIME=0
40 FOR Y=0 TO 1020 STEP
8:MOVE 0,Y:DRAW 1272,Y:TIME
50 PRINT "TIME"
60 #F115,1
```

By MICHAEL JACOBSEN

add the following lines:

```
22 #FX163,128,1
78 #FX163,128,8
```

This turns off the analog interface (ADC), and the program runs as fast as on an unexpanded Electron. Now enter:

```
24 #FX178,8,8
88 #FX178,255,8
```

This stops the keyboard interrupt while the program is running and now the time taken is only 6.4 seconds, no matter whether keys are pressed or not.

As you can see if you run a game on an Electron with a Plus 1 which uses the keyboard it is possible to increase the speed by 230 per cent.

If you just want to do calculations or draw a new screen in a game you could add these lines:

```
260 LD MODE=7&282:7&282=8B:7
&FE07=&8B
987&282=LD MODE:=7&FE07=LD M
ODE
```

This turns the screen off and the program only takes 3.1 seconds. Compared with the 14.7 seconds in the worst case, this is an increase in speed of more than 470 per cent.

Note that it is not enough just to poke a value into &FE07, as the operating system switches back to the old mode stored in 7&282 if sound is used.

As the above example illustrates, a program is slowed down considerably when the keyboard is used.

It is easy to stop the keyboard interrupt using *FX178,0,0. However this means that we can no longer get input from INPUT, GET or INKEY.

This is fine though if the

program is just doing calculations or if a joystick is used.

When the keyboard is disabled the OS is no longer told what is happening to the keyboard. However it is still possible to read the keyboard – you just have to access the hardware directly. This is only possible from machine code.

Program II reads the keyboard directly and tests the keys *, X, /, Z and Return. If you run the program you can move a character around the screen. Now insert the line:

```
235 #FX178,8,8
```

to disable the keyboard and the program runs faster, but you can still control the character from the keyboard.

The keyboard is treated as ROM number 8 and any key can be read just by reading a certain bit from this. Each column of four keys on the keyboard share a byte of memory in it.

Table I shows which bit of which byte you must test to read any key. For instance the seventh column consists of the keys 6, Y, H and N.

These keys share a byte at &BF7F. Bit 0 of &BF7F tells if 6 is pressed, Bit 1 if Y is pressed and so on. Bits 4 to 7 have no significance.

To read the keyboard you

must first select the keyboard ROM. The current ROM number is stored at &F4 and &FE05, so you must write to these addresses. It can be done like this:

```
LDA #8
STA &F4
STA &FE05
```

If you wish to know if Y is pressed you must read location &BF7F, so we simply use:

```
LDA &BF7F
```

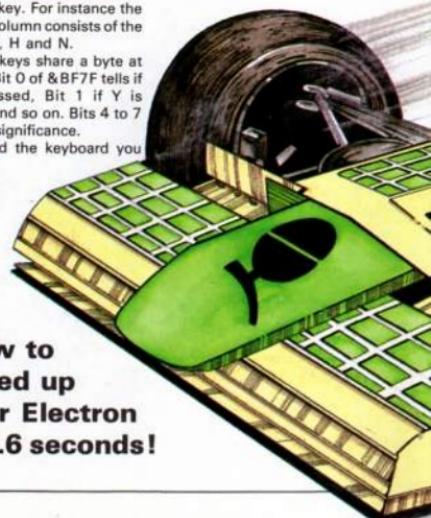
and test if Bit 1 is on:

```
AND #1
```

The key Y is pressed if the accumulator is non-zero.

When the keyboard ROM has been selected any key can be tested using just five bytes. This way of testing a key is almost the same as using INKEY (-X) or osbyte &79, but much faster.

Program II saves memory by creating a table containing the addresses of the keys and a mask table to test the correct bit for each key. The result is



**How to
speed up
your Electron
in 6.6 seconds!**

stored in a key table.

If you wish to return to Basic or any other language from machine code you must reselect the old ROM. This is done by poking the old value of &F4 back into &F4 and &FE05.

Note it is not enough just to poke a value into &FE05 as the operating system will take the contents of &F4 and put it into &FE05 when it gets a chance.

If you wish to read a string of keys, for instance to add a name to a highscore table, it is easier to enable the keyboard - using *FX178,255,0 and do it the old way.

If you have a Plus 1 the ADC will interrupt your program just like the keyboard does. The ADC can be turned off using *FX163,128,1.

Now what if you wish to read a joystick? Easy, read it directly. To read an ADC channel directly you must poke a value into location &FC70. The value for each channel is:

Channel	Value
1	4
2	5
3	6
4	7

To read channel 1 you would use ?&FC70=4. Then you must wait until the ADC has finished the conversion. When the 1 byte value from

that channel is ready Bit 6 of &FE72 becomes 0. You could test it like this:

```
REPEAT:UNTIL(?&FC72  
AND&40)=0
```

Now the value of that channel can be read as a 1 byte value at &FC70.

I=&FC70

If you wish the result to be compatible with ADVAL(1-4) multiply the result by 256. The problem about this and the normal method of reading a joystick is that a lot of time is spent waiting for the conversion to finish.

It would be better if we could ask the ADC to read a channel and then do something else while it is converting.

Program III uses an event routine to read channels 1 and 2 without any delay. Once the event is started you can read the X and Y channel just by reading &Jox and &Joy.

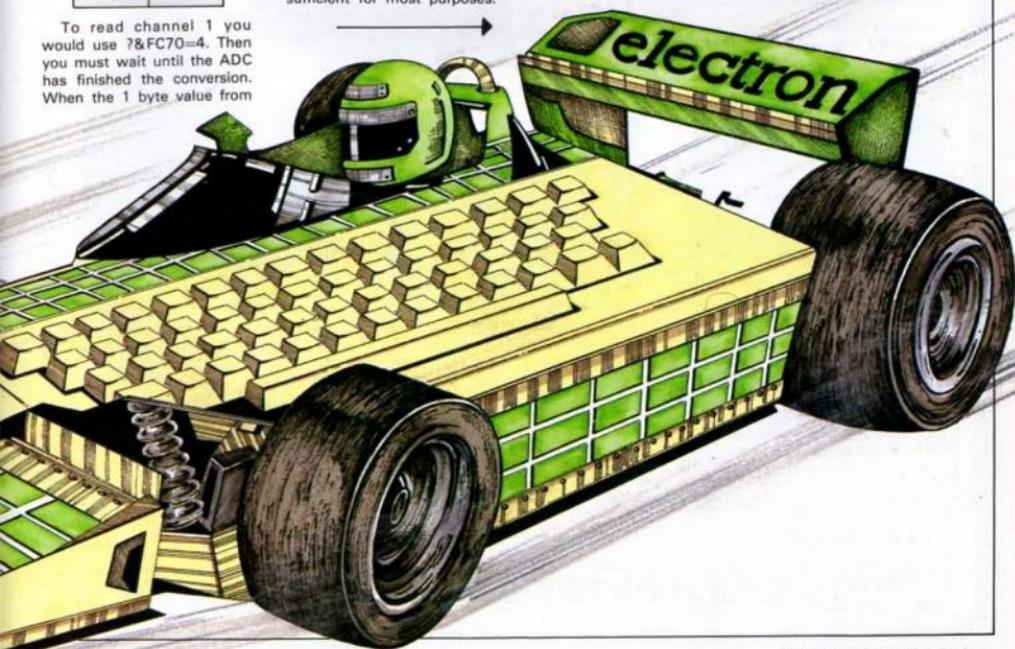
You could use the ADC conversion complete event, but I have used the start of vertical sync event as it only interrupts 50 times a second.

This means that Program III reads each channel 25 times a second and this should be sufficient for most purposes.

```
10 REM PROGRAM II  
20 REM Direct Electron K  
eyboard Read  
30 REM Michael Jakobsen  
40 REM Enter 235#FX178,0  
,0 for fast mode  
50 MODE2  
60 Key=&70:Keyadd=&80:Ke  
ymask=&80:Oldrow=&7A  
70 FORX=&TO4:READA,B:?(K  
eyadd+X#2)=A?:KEYADD+X#2+1  
)=A DIV&100:KEYMASK?X=B:NEI  
T  
80 REM * I ?  
90 DATA&BFFB,4,&B7FF,8,&  
BF7,8  
100 REM Z Return  
110 DATA&AFFF,8,&BFFD,4  
120 FORI=&TO2STEP2:PI=&C  
00:OPTII  
130 I Remember Old Rom  
140 .Rkb:LDA&F4:STA Oldro  
5  
150 \ Select KeyBoard Rom  
160 LDA#8:STA&F4:STA&FE0  
5  
170 \ Read Keys
```

```
180 LDY#8:LDY#4  
190 .Rkc:LDA(KEYADD,X):AN  
D Keyask,Y:STA Key,Y  
200 DEX:DEX:DEY:BPL Rkc  
210 \ Back To Old Rom  
220 LDA Oldrom:STA&F4:ST  
A#FE05  
230 RTS:J:NEXT  
240 REM Test Keys ~  
250 X=1:Y=1:C=1  
260 VDU23:6282:8:8:8:  
270 REPEAT  
280 CALL Rkb  
290 IF Key?0THENX=Y-1:IF  
Y?0THENY=0  
300 IF Key?1:0THENX=X+1:  
IFX>19THENX=19  
310 IF Key?2:0THENY=Y+1:  
IFY>30THENY=30  
320 IF Key?3:0THENX=X-1:  
IFX<0THENX=0  
330 IF Key?4:0THENC=C+1:  
IFC>7THENC=1  
340 COLOUR C:PRINTTAB(X,  
Y)";  
350 UNTIL#
```

Program II



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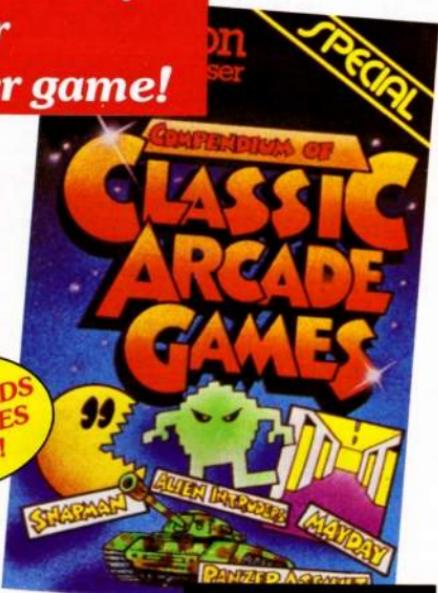


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TO ORDER TURN TO THE FORM ON PAGE 53

From Page 41

The fire-buttons are read as:

Fire1=(?<&FC72 AND &18)

and

Fire2=(?<&FC72 AND &20)

The result is zero if a button is pressed. If you want the result to be non-zero when a button is pressed use:

Fire1=(?<&FC72 AND
&18)**EDR&18**

```
10 REM PROGRAM III          118 AND#1:TAY:STX Joy,Y
20 REM Direct Electron J    120 RTS:J:NEXT
 joystick Read              138 #228=Rjoys M0D256:#?
30 REM Michael Jakobsen    221=Rjoys DIV256
40 MODE2                   148 #FX14,4
50 Joyx#70:Joyz#71         158 PRINT":Joystick Read
60 #FX163,128,1             ;VDU23:8202;0;0;0;
70 FORIZ=BT02STEP2:PI=&C      160 REPEAT
80:LOPTII                  170 PRINTTAB(0,5)"X=";STR
88 Rjoys:LDX&FC78           $?Joyx;" ";TAB(18);"Y=";STR
90 Rjchn:LDA#4              $?Joyz;" "
100 EDR#1:STA Rjchn+1:ST     180 UNTIL#0
A&FC78
```

together with:

Fire2=(?<&FC72 AND
&20)**EDR&20**

Finally if you wish to read the fire-buttons exactly as with ADVAL(O):

Fire=(?<&FC72 AND#38)/&18
EDRS

Using the above methods it is possible to make your Electron run 230 per cent faster even with a Plus 1 fitted.

If you think it sounds a bit

confusing just experiment a little. You will see it is quite easy to adapt the methods in your own programs.

This is an absolutely free way of getting a Formula 1 Electron.

Finally, the Electron keyboard consists of 14 columns each with four keys. Table I contains the addresses in the keyboard ROM of the 14

columns (0-&D and the keys that can be read at each address).

The addresses have been calculated as Add=&BFFF-2^Column. The first key listed at each address is Bit 0 and the last key is Bit 3.

Note that the keyboard is selected as ROM number 8 or 9, both are equivalent. Basic is ROM number 10 or 11.

Column	Address	Bit: 0	1	2	3
0	&BFFE	Right	Copy	NC	Space
1	&BFFF	Left	Down	Return	Delete
2	&BFBB	-	Up	:	NC
3	&BFF7	0	P	:	/
4	&BFEF	9	O	L	.
5	&BFBF	8	I	K	,
6	&BFBF	7	U	J	M
7	&BF7F	6	Y	H	N
8	&BEFF	5	T	G	B
9	&BDFF	4	R	F	V
A	&BBFF	3	E	D	C
B	&B7FF	2	W	S	X
C	&AFFF	1	Q	A	Z
D	&9FFF	Escape	Caps Lk	Ctrl	Shift

NC = No connection

Program III

Table I

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Solving the riddle of the Sphinx save game routine

THE response to my request for a save game routine for *Sphinx Adventure* has been very good.

The first person to send me a routine was John Cummings and he wins a copy of *Woodbury End* and *Terrormolinos*, both of which are superb adventures.

I have listed below the changes that need to be made to Sphinx.

Still on the same subject

Rob Harley has written to say that I made a mistake when I said that the bad program fixer was in the December 1984 issue of *Electron User*. In fact it was in the December 1984 issue.

Rob goes on to say that there is a bug in Sphinx. If you type in " as a response to the What Now? prompt, the game crashes.

However typing in directly &5774=&FF and then typing

in RUN gets the game running again. Rob goes on to say that issuing an *FX200,0 can prove handy too.

M. Wheeldon is our first Lord of Adventure. He has written in offering help on three adventures. See below for more details.

You will have noticed that I have been printing a series of maps of *Terrormolinos*. If there are any other maps you would like let me know.

```

44 LOMEM=1598A:D$="nsedu
d:KN=8:MS=8:S=8:WA=8:0=MCB
:EX=8:L=6
202 A$=FCNV(A$):IFLEFT$(A
$,3)="inv"PROCL(1):GOTO 191
ELSE IF A$="load"PROCLa ELS
E IF A$="save"PROCLa
2000 DEFPROClo
2005 LOCALI,f
2010 PROClf
2020 f=OPENIN(f$)
2030 FOR I=0 TO 255
2040 INPUT#f,L,SC,KN,MS,S,
A,K,W,I,I,X,T,CH,VO,KL,CF,D
SA,FL,LI,C,V,B,BE,RA,LF
2050 NEXTI
2060 INPUT#f,L,SC,KN,MS,S,W
A,K,W,I,I,X,T,CH,VO,KL,CF,D
SA,FL,LI,C,V,B,BE,RA,LF
2070 CLOSE#f:A$="look":END
PROC
2080 DEFPROCf
2090 INPUT"filename?":f$:IF
LEN f$>7 OR LENf$<1 VDU7:P
RINT:GOTO 2198
2100 #OPT1,i
2110 ENDPROC

```

FEEDBACK

Linda Smith has written in with help for Harvey Reynold's problems in *Ghost Town*. You can't play the mirror, even though you think you should be able to.

You should TAKE BELL, GO EAST from the counter in the hotel, RING BELL, MOVE BED and TAKE TAPE.

Go back to the saloon and TAPE MIRROR, BREAK MIRROR, GO HOLE, PASS BOARD, TAKE \$200 and TAKE BOARD. When the ghostly pianist appears CLAP, PLAY PIANO, OPEN PIANO and READ MAP.

Geoff Larsen has written in again with lots of help with

previous problems. To start with he has taken me to task for giving wrong information about *The Count*.

You do have to go into the oven, but go in at night when it is cooler.

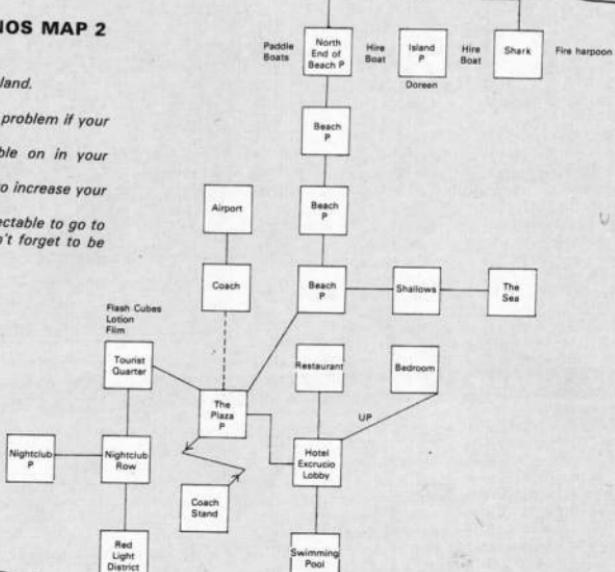
With regard to Harvey Reynold's problem in bringing the telegraph keys together in *Ghost Town* - move the large safe in the telegraph office and repair the two loose wires.

Now press the second key in the line shack across the ravine - with the gunpowder having been left in a keg in the telegraph office.

In *Pyramid of Doom* you don't need to shoot the

TERRORMOLINOS MAP 2

P = Take photo.
 Call Doreen on the island.
 Swim in the sea.
 Sunstroke is a knotty problem if your hanky isn't on right.
 Put something suitable on in your bedroom first.
 Eat in the restaurant to increase your score - bitter pill.
 Wear something respectable to go to the nightclub and don't forget to be flash.



LORDS OF ADVENTURE

This section is devoted to ardent adventurers who are prepared to answer reader's questions on particular games.

Write to them if you need help with the games mentioned, but please

remember to send an SAE with your letter.

M. Wheeldon of 225 Pensby Road, Pensby, Wirral, Merseyside offers help with *Twin Kingdom Valley*, *The Eye of Zoltan* and *Firienwood*.

nomad. If you have the gun he seems less likely to attack you anyway.

In *Spiderman* the block of ice is the frozen aquarium.

Terrormolinos has raised quite a few problems over previous months and Geoff has provided answers for these too.

Snorkelling in the bay will earn you more points. To take an excursion you should GO BULL, GO WINE or GO MONASTERY. To take the camera off the shelf you must first get and lock the steps and then climb them.

You also use the ladder to get to the loft and typing

PROBLEM CORNER

J.J. Foggett has written in with questions about several adventures. In *Castle of Riddles* he keeps drowning in the boat.

Yes, you need the bucket. Don't try to dig it out, just keep TAKING IT. When you get to the boat bail out.

Don't just use an explosion to get rid of the giants, use it to open a box as well. When the giants have gone explore the gallery to find another treasure.

You'll find your score will increase when you put things in the safe. Haven't you

SOS

Linda Smith is having trouble with *Ghost Town*. She wants to know if there is a word that will make the horse carry you rather than throw you off.

She also wants to know if you can get to the mountains, open the safe and what use are the fiddle strings. Can anyone help her out with these?

wondered what those letters on the wall mean? There's one in each location, they aren't all in one location.

In *Bored of the Rings* try inserting the battery into the vending machine. I'm not sure where location 17 is, but try planting some beans there.

Peter and Val Russell need to find Mr Snargsby to finish *Terrormolinos*. Go down into the catacombs, find him and call him.

The problem of finding the parachute in the forest in *Stranded* has cropped up again. Paul Dougherty says that he has tried CLIMB TREE, but gets the response "You can't do that now".

The reason for this is that you are trying in the wrong place. Go north from the first location you come to in the forest and then try.

I have checked this on the game itself as well as on my map and it definitely works.

Susan Parsons and Robert Carlton have both written in

From Page 45

asking for help with *Dracula Island*.

The heavy thing is an iron ball and you can find it by going down in the hut near the start location, though you will have to have the knife and crucifix to get past the snake first.

Susan also needs to get the ball but should get the gloves from the armchair in the library first, then go back to the hut and DROP ROPE, LIGHT

LANTERN, WEAR GLOVES and CLIMB ROPE.

If you sit in the armchair and drop the ball you can now find a secret door in the kitchen.

M. Wheeldon is having problems with *Five Stones of Anadon*. Move the tombstone in the cemetery.

Wear the gloves and get the plank, then go down. Use the plank to cross the pit and when you get to the rubble use the dynamite. You will soon find the cross.



HALL OF FAME

Woodbury End—Les Shipton

Here are some more clues:

- Bright light child's delight. Switch the beacon on in the auditorium.
- The bell can end the hell. Take the children to the village green when the clock chimes at midnight.
- Circular logic rules. Run around the oak tree to gain access to the fairground. RUN NORTH, RUN EAST, RUN SOUTH, RUN WEST, RUN NORTH then GO NORTH.
- Pal in drome – not quite. To gain access to the chambers, in the fairground move east from the door with the bat.

Wheel of fortune (continued) — Craig Romans

Explore the area you arrive at and head for the road leading south. You will hear a bird singing. Play the music box to get rid of it.

Now go to the china shop and ring the bell for service. Do what the man tells you and find the farmer. When you have found him tell him THE BULL IS IN THE CHINA SHOP and lead him to it. You will be rewarded with another penny.

Now go back to the field and explore it thoroughly. If you haven't managed to get past the snake you must drop the basket and play the flute.

Take the basket again and go to the canal bank. When you see the troll drop the basket and play the flute. The troll will run off and you can now enter his cave. You can leave your treasures here in safety.

Now go and fill the cup with oil, but remember to leave the basket outside the cave so that the troll can't get back in.

If you have got the silver bullet with you you should now go back up through the trapdoor. Go to the machine and insert the penny and get the gun.

Load the gun with the bullet and go to the well and get the bucket. Go to the building and spin the wheel.

Spiderman (continued) — Robert Henderson

When you see Dr. Octopus grab his arms and hit Electro. Now go to the penthouse and lower the thermostat until it is less than 32 degrees.

Then go to floor 1, get the aquarium and take it to the hall. Go back to the penthouse and turn the thermostat back up. Go back to floor 1 and get the gem out of the aquarium.

Take everything you can carry, including the aquarium, Electro, the couch and so on, and drop it all on the giant scale.

Now go to floor 3 and type RUN on the computer. Go to the presses and get the newspaper, open it and get the gem. There are also gems in the lift shaft's tool niches. You must

leave gems with Madame Web regularly or your inventory will soon fill up. In addition to gems I have mentioned there are also some just lying about but you'll have to find them.

When you have deposited all the gems with Madame Web type SCORE. The chief examiner will appear and tell you a password.

The Count (continued) — A.J. Haynes

Day Two.

Raise the dumb waiter to the pantry. Take the matches, sheets and garlic and go down in the waiter to the dungeon. Find the pit and tie the sheets to the rings.

Climb down into the pit and light a match to reveal a torch. Climb back up the sheets and go to the front door and wait for the package — postcard and note — to be delivered.

Take everything to the closet, open the package and store it all here — except the blood and clip. Lock the door and go back to bed and sleep.

Revenge of Zor — H.J. Bastien

Some more hints that should help:

Rub the ring to kill the hydra. Wear the spectacles to read the book. Use the casket to keep the torch and matches dry.

Examine the sandwich to get the flies and eat the sandwich to move the boulder.

The key is behind the waterfall. GIVE COINS to enter the carriage. Make sure you have the right objects before entering — once in, you can't get back.

Robin of Sherwood — Martin Hanson

First of all you must escape from your cell so STAND on the PRISONERS and then GRAB the guard's ANKLE when he passes overhead.

Then STRANGLE GUARD, EXAMINE GUARD, GET SWORD, PULL BOLT and OPEN GRATING. Next GO DOOR, GO BATTLEMENTS, GO DOOR, GO RIGHT and GO WINDOW.

You now need to map out the forest. From your start location in the forest imagine you are on a horizontal line. You can move three locations east and four locations west.

At no point on this line can you move south. Including your start location the map extends for eight locations vertically.

This means that there are 64 locations on your map (8x8). There are also several locations outside this square.

Your first task is to explore the limits of the map and discover these extra locations then compile a map to show all the locations both inside and outside the square.

Micro Messages

I HAVE had an Electron for just over a year. In that time I have added a Plus 1, an HR printer and recently the Plus 3.

The computer has been used for Scout records, letters, and training. A Morse code program was very useful for the communications badge. (Four of the boys also have Electrons.)

At the local gala road race the computer was used to keep those waiting at our town hall start/finish up to date with the race.

The details of 250 runners were programmed in. Their numbers were radioed over Citizens Band from the refreshment/first aid points on the route.

They were entered into the Electron which displayed on monitors the runners' position, time, and details for the waiting crowd and for the race controllers to announce over the public address system. This was very successful.

I am also involved with the local dramatic society as theatre electrician for lighting, sound and effects.

At two productions, both requiring fairly complex and fast sound effect plots, I used the Electron programmed with "MOTOR commands and TIME delays to cue the taped sound effects.

The monitor was used to display instructions and cue lines for the operator. This allowed my colleague to stand in successfully after only one practice.

This method of controlling the cassette player is much better than watching the tape counter and controlling the cassette manually.

It makes possible putting all the sounds on one tape as the sound required next can be called very quickly by pressing say the Spacebar.

The problem with this system is that it is under the control of the one relay inside the Electron. Are there any publications available which could be of help in making a circuit to control other relays via, say the Plus 1 ROM sockets?

This would greatly increase

Electron proving a Jack of all trades

the possibilities for computer controlling many other low voltage powered effects at present requiring manual switching - Ian Johnston, Moffat, Dumfriesshire.

- We don't know of any publications describing the use of the Plus 1 ROM socket.

Advanced Computer Products are working on a Plus 5 interface which may be suitable for control applications.

Parents often know best

I FEEL for O. F. Foreman (Micro Messages, June 1986). However, in my children's school they believe satisfactory educational software can never be commercially produced; only teachers, in day-to-day contact with pupils, can assess requirements accurately.

Accordingly, they write their own software as far as possible - most teachers under about 40 have used computers in some form at university.

If they get bogged down, they write to parents for advice. After all, there are many parents nowadays who

use computers at work.

Besides, we know the latest tricks of the trade to shorten programs.

Such programs are copyrighted in the name of the school but no fees are expected or paid. We parents also are vitally interested in our children's education!

Come on, Mr Foreman. If you can't write the software yourselves, swallow your pride and ask the parents. You will be astonished by the response.

How many commercial software packages do you think are not amended by users to suit individual company quirks? Do you expect your traditional chalkboards to write themselves?

Computers are a useful tool at any school but software must be the smallest problem.

- R. H. Hill, Woodford Green, Essex.

Clues for Commando

I HAVE some hints for the Electron version of Commando. First of all do not try to shoot masses of enemy soldiers while you are in no man's land.

Find some cover to hide

ALL programs printed in this issue are exact reproduction of listings taken from running programs which have been thoroughly tested.

However on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program

they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

behind before you start to eradicate the enemy soldiers. If there are any mortars in the vicinity, get as close as possible to them and either fire a round or throw a grenade.

Throwing grenades at mortars is recommended because you do not have to get as near to the mortar emplacement and thus the risk of death is far less.

This method of killing lots of soldiers is best used at the start of the game because you can increase your number of lives from three to around nine - the more lives you can obtain the better your chance of completing the game.

Also collect as many boxes of grenades as you can. Do not bother throwing grenades at single soldiers because this is uneconomic.

When you arrive at a bridge throw a grenade just before you enter the tunnel and walk in the central part of the tunnel, so you can avoid any surviving soldiers.

When you arrive at the opening gates, move in line with the opening and throw a grenade. This will kill the first soldiers who come through the gate and give you more time to manoeuvre.

Keep firing bullets while soldiers are coming at you from any direction; this will kill most of them.

On the second level there is a camp in front of the second gate and quite often a soldier hides here.

To kill him move to the bottom of the relevant side of the screen and fire bullets or throw grenades. If this method fails, wait and the soldier will move out from behind the camp, when you can shoot him.

On the third level there are no real problems apart from

From Page 47

two mortars just before gate three. Again throw grenades to destroy these emplacements.

Level four, the final one, is very simple. Again use grenades wisely. The rules for gates also apply at the fortress.

From there hints you will be able to tell I have completed the Electron version of Commando. Am I the first to do this? — David Tester, Bolton, Lancs.

• You're certainly the first reader we've heard of to complete the game. Thanks for the hints and tips.

In need of a new Elite

ARE all you Elite fans now bored with it, having become Elite? If so get writing to Acornsoft and convince the authors of this great game that we need a follow-up.

Maybe an even more futuristic game with a new faster, powerful type of ship — the Cobra Mk IV maybe?

Once you have achieved Elite status and have all the "bolt-ons" for it, the game is far too easy, I'm sure you'll agree.

So start writing and maybe they will see the advantage of such a game. After all, the original did sell very well. — Commander Scorpio, (Elite).

Splash got me in deep water

AS an experienced typist, but a newcomer to typing in computer listings, I would like to call your attention to the game "Splash it All Over" in November 1985 issue of Electron User.

Many beginners must have found this program impossible to do without consulting an expert — which I had to do before overcoming the problem.

I am referring to line 640 which cannot be typed completely unless abbreviations

WHAT would you like to see in future issues of Electron User?

What tips have you picked up that could help other readers?

Here is your opportunity to share your experiences.

Remember that these are the pages that you

write yourselves. So tear yourself away from your Electron keyboard and drop us a line.

The address is:

Micro Messages
Electron User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY.

are used, but you made no mention of this.

I can only type to the final VDU whereupon the computer goes on strike and refuses to accept any more of that line. — F. Harvey, Longford, Coventry.

• Occasionally you will come across lines that are apparently too long to fit in and the Electron simply refuses to accept them.

In these cases using the abbreviations listed in the Electron User Guide will solve the problem.

As all submissions to Electron User must be on tape or disc so they can be thoroughly tested we never actually type them in. Consequently this problem can easily be missed.

Incidentally, I obtained a replacement Welcome disc from Acorn but the same problems are apparent.

Can you tell me what is wrong? Is there a fault on my computer or disc drive unit? — P. Harmes, Buckley, Clwyd.

• Nothing is wrong with the backup utility on your Welcome disc or your Electron or drive, the utility is simply very slow at copying discs and requires around 80 disc changes.

I have tried using the Welcome disc utility *BACKUP. However I think that there must be a bug in this particular program.

The basic problem is that the program fails to terminate — no prompt reappears and/or no instruction is given to say that the copying process is completed.

The computer continually gives the instruction to swap the source and destination discs.

After swapping for 20 or 30 times, if this process is terminated by Control and

Break, the database program has been copied on to the blank disc, although it is corrupted. Various error messages appear when any attempt is made to use the backup copy.

I have also used *DIRCOPY, following the instruction on page 11 of the Plus 3 manual and user guide errata (press Return twice in place of "Library" to backup the whole disc).

Once again, I have been able to make a copy onto a blank disc, but when attempting to add records to a file the program crashes and the error bad program appears.

Incidentally, I obtained a replacement Welcome disc from Acorn but the same problems are apparent.

Can you tell me what is wrong? Is there a fault on my computer or disc drive unit? — P. Harmes, Buckley, Clwyd.

• Nothing is wrong with the backup utility on your Welcome disc or your Electron or drive, the utility is simply very slow at copying discs and requires around 80 disc changes.

If you press Break after 20 or 30 disc changes only part of the disc will have been copied and the rest will have been corrupted.

A Plus 3 disc stores over 320,000 bytes of information and the Electron only has around 17,000 bytes of RAM free.

This means that even if all the free memory could be used a disc could only be copied in chunks of 17k, and each chunk requires two disc changes. That adds up to about 36 changes.

You'll find a fast backup utility in the February 1986

issue of Electron User which reduces the number of disc changes to around 25.

A routine check-up

SINCE owning a Plus 3 disc drive I have been successfully using the downloading routine included in your listing of Skramble to load games from disc.

Recently however I have found two examples which will not run using this routine.

These are Time Bomb and Higher or Lower both from July 1985 issue of Electron User.

These games produce the error 'No room at line ...' yet both work perfectly when loaded from cassette with Page set to &EOO.

Do you know how the games can be run from disc? — Stephen Thomas, Bishopsworth, Bristol.

• The solution is quite simple: Define function key 0 to download the program using:

```
#KEY0 #T.!MDI=PAGE-&E00:FOR  
I:=PAGE TO TOP STEP  
4:!(I-D)=I:=NEXT:PAGE=&E  
00:MOLD=MRUN#M
```

then when the program has loaded press F0 to run it.

Actually adding the function key definition to the listing may cause it to run out of memory.

Invasion Force out of line

ALTHOUGH the discovery of your magazine has vastly increased my understanding of the Electron I do have one small complaint to make.

Having faithfully typed in the listing of Invasion Force in the April 1986 issue I was not amused to find it wouldn't run.

The fault seems to exist in line 100, and no matter how many times I check it the result is always the same.

Please tell me that the listing is incorrect. I would hate to think that my wife, next door neighbour and myself are all going blind.

The error message is 'No

Super show, but no space

I HAVE just returned from another superb Electron and BBC Micro User Show — all-be-it rather jaded after the crush. Well done Database Publications for continuing to support the BBC Micro and Electron as you do.

Several items come to mind after this visit which I feel to be worthwhile a mention in your columns, and to the interest of your readers.

Firstly the show itself. So much to see, but even with my own 6ft 4in and 17 stone, great difficulty in being able to see much due to the sheer volume of human bodies in such a confined space, and this on the first day.

Any children, and this included by own son who accompanied me (this day off school considered to be of great education value) had great difficulty in being able to get near any of the stands.

I was concerned also for the several disabled persons in wheelchairs — their task on Friday was almost impossible.

Is it not time that Database considered an exhibition centre which will adequately house the show, even if this means higher entrance fees?

The freedom of movement and ability to see all would more than compensate for any increase in prices.

A word also to Slogger and ACP, please increase the size of your respective stands. If interest in your products in support of the Electron continues, as there is no doubt that it will, at future shows your stands will be trampled under the crush.

I attempted on two occasions to get near the ACP stand, and after half an hour in the crush, gave up the attempt.

Micronet 800 were as unhelpful as ever. At the Autumn 85 show, I was assured by this stand that material for the Electron would quickly become available on Micronet 800 with the launch of the Pace Nightingale/Commstar package. Taking

their word, I quickly bought this communications package, and over six months later I am still waiting for one single frame on the whole of Prestel/Micronet which supports the Elk.

I am continually told that Electrobeeb, page 800931 is the answer to my problems, but all this does is increase my frustrations for it appears to be entirely dedicated to the BBC Micro and should more honestly be recalled Beebspot.

Micronet really should get their act together and provide the service which their sales patter offers. After all, we Electron owners pay the same subscription as all the other PC users who are most adequately catered for.

In the defence of Micronet, I was advised by the staff at the stand that they have very few Electron users on the system, so maybe the solution lies in our own hands, to apply pressure until we get a response.

Slogger and Pace have

problems with compatibility between the Plus 1 upgrade ROM and Commstar ROM.

With the Plus 1 upgrade chip fitted, and calling Commstar, the Electron locks up.

A telephone call to Slogger after the show was as helpful as ever. "Yes there was a problem, and yes we are looking into it, and yes, we will be in touch when it is solved."

Great after sales service — well done Slogger once more.

Shouting across the crush to the ACP stand, I was assured that the ACP 5 will be on the market shortly. This is the item all serious Electron users have been waiting for.

So another show is over and I am even more convinced that the Electron as a little acorn is steadily growing into a mighty oak.

Keep up the good work chaps. Keep producing the goods and we will continue to part with our money — if we can get near the stands that is!

— Trevor Dunkerley, Reading, Berks.

such variable at line 100' — D.W. Daglish, Drumchapel, Glasgow.

● The listing is correct. In fact this is the first letter we've had concerning Invasion Force.

If you've checked line 100 several times then it probably is correct and you aren't going blind at all.

'No such variable' is a peculiar error report in that often the error is elsewhere in the program and not in the line at which the Electron stops. Please check the whole listing carefully.

plugging it in, or is some other device necessary before it can perform?

The printer in question is an Epsom. — G. T. Jackson, Liverpool.

● The only additional piece of equipment you'll need to use a printer is a cable with the appropriate connectors at either end. You should be able to buy one with your printer.

however, that I have been able to recall programs using OLD after doing a hard break. Is it normal to be able to do this? —

Paul Williams, Weston Super Mare.

● A hard break isn't quite the same as turning the Electron off then back on. If you enter:

*FX200,2

it will be possible to recover the program using OLD. If, however, you enter:

*FX200,2

you will not be able to recover the program since the Electron will clear all the memory from &400 upwards.

OLD remedy for recovery

I HAVE a query concerning the soft and hard break facility on the Electron.

Everything I've read says that a hard break has the same effect as turning the computer off and then on again, completely resetting it.

I have noticed recently,

writing a few simple programs, but I have hit a snag with programs using INPUT, for instance:

10 REM Program
20 PRINT "Are you old?"
30 INPUT answer

Now how do you get the computer to print two different statements, depending on whether the INPUT answer is "yes" or "no"? — James Baker, Scote, Norfolk.

● What you are inputting here is a number when you really want a string. Change answer to answer\$ and add these lines:

```
40 IF answer$="YES" THEN  
PRINT "I don't mind."  
50 IF answer$="NO" THEN  
PRINT "Ok."
```

Connection quandary

I AM almost about to order an Electron Plus 1, but have one doubt. If I buy the Plus 1 is it a simple matter of connecting up a compatible printer by

Wrong type of answer

I RECENTLY bought an Acorn Electron and am capable of

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On the April 1986 tape:
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On the February 1986 tape:
NECROMANCER Superb text adventure. **GREBIT** Arcade action. **FAST BACKUP** Disc utility.

MACHINE CODE How to write an arcade game. **TAPEDISC** More software transferring techniques. **SIDEWAYS RAM** Example program.

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On the July 1985 tape:
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On the June 1985 tape:
QUASIMODO Boring classic. **DISASSEMBLER** Machine code utility. **ACTIVITIES** Educational fun. **REFLECT** Aggressive aliens.

ENGINE Animation. **DODGE** Race track action. **STRINGSALON** Scrolling fun. **CASTLE** Medieval graphics. **MATHS CURVE** Angles and art. **NOTEBOOK** Trees.

On the May 1985 tape:
SKRMLLET Computer arcade game. **SCREENTEST** Screen test. **LIFE** A cultured classic. **THREE-D** Outstanding utility. **SPIDER** Educational fun. **MOONBIRD** Heavenly displays. **BLAZON** Heraldic device. **FLOWERS** A basic bouquet. **NOTEBOOK** Heraclitus.

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On the March 1985 tape:
MR. FREEZE Ice cube arcade game. **PICTURE EDITOR** Two procedures for printer dumps. **FILLER** The machine code fill routine. **FRED'S WORD GAME** **PICTURE EDITOR** Set and read data. **PERCY** Large text utility. **PERCY** Best the bunning fuse. **REAST** Two example programs. **PIGS** Flying pig. **NOTEBOOK** Display formatting.

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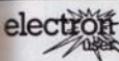
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LOOKING INTO TEXT WINDOWS

BY NOW you should be drawing coloured lines all over the place. All you need are the GCOL, MOVE and DRAW commands and some numbers for them to work on.

Put the Electron into Mode 1 with:

MODE 1

and then select the colour red with:

GCOL 8,1

The mode change will have moved the graphics cursor to the bottom left of the screen – the point with coordinates 0,0. Next draw a line across the display with:

DRAW 1279,1023

Now take a look at the screen. Unless you've done some mistyping or added a few commands you should have a screen with the last two commands – the GCOL and DRAW – at the top left. Also there's our red line, which is the result of these commands.

Notice that our GCOL command didn't affect the colour of the text, which is still white. If we wanted red text we'd have to use:

COLOUR 1

to do it.

Another thing to notice is that the graphics cursor and the text cursor are completely different things. The text cursor is the annoying flashing white line.

At the moment – unless you've altered or added to the above commands – this is three lines down the screen, by the prompt. It shows where the next bit of text is going to be printed.

Meanwhile the graphics cursor is at the top right of the screen, point 1279,1023. Our DRAW moved it there from its original position at the bottom left, leaving a red line trailing behind it.

From all this you should see that the Electron treats text and graphics displays very differently. In fact it looks on

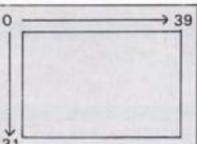


Figure I: Mode 1 text screen

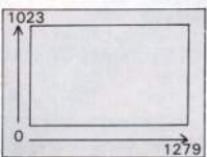


Figure II: Graphics screen

them as two completely different screens, one for text and one for graphics.

They just happen to coincide at the start of things. With the micro in Mode 1, Figures I and II show the Electron's slightly schizoid view of the screen.

However it's not just the Electron which looks at the screen in two ways at once. When we want to print something at a particular point on the text screen we use PRINT and TAB looking on the screen as it's described by Figure I.

It's usually one of the first things learnt in Basic. If we need coloured text then COLOUR is brought into play.

Yet if we want coloured lines we use DRAW and GCOL along with the coordinate system shown in Figure II.

Let's face it, we've got the same divergent ways of looking at the screen as the Electron.

As I've said, at switch-on or after mode changes the text screen and the graphics screen cover the same area, the whole of the display.

However, it doesn't have to be like this. We can define a text window as a rectangular area of the screen in which all the things we PRINT and TAB are made to appear.

In effect the text screen that originally occupied all the display is reduced in size to take up only part of it. The command for creating a text window is:

VDU 28,botmax,bottomy,
topx,topy

The VDU bit tells the Electron that it's one of the commands that refer to the Visual Display Unit – the telly or monitor. The 28 indicates which particular action to take – in this case to create a text window.

The four figures that follow are the coordinates of the bottom left and top right corners of the text window. These are measured in character spaces and lines from the

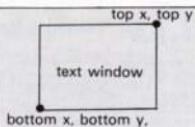


Figure III: Text windows – the coordinates used

top left corner of the screen, just like TAB.

Figure III shows how the coordinates are related to the text window. Be warned – the punctuation used in VDU commands is vital. Get it right or weird things can happen.

Let's see a text window in practice. Clear the screen and enter:

VDU 28,4,38,28,4

You now have a text window, even though nothing appears to have happened. However if you look closely you'll see that the prompt, > is inset. It's at the start of the text window.

Now hold down a key, say

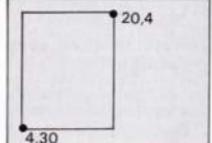


Figure IV: Our first text window
the N key, and see what happens. Instead of the line ofNs going right across the screen as normal they only get so far and then start again on the line below. They're trapped inside the text window.

Figure IV shows the text window and the coordinates that define it.

As soon as you've had enough of the Ns try entering CLS to clear the screen and see what happens. All the Ns – or whatever you used – disappear, but notice that the original:

VDU 28,4,38,28,4

is still sitting up there at the top. Why hasn't CLS wiped it?

The answer is that CLS only works on the text screen and we've just limited that to a bit of the screen starting 5 lines down from the top. The previous command is still stranded on the first line.

Now this top line is still part of the graphics screen which covers the whole screen area until we issue the appropriate VDU command.

So if there's a keyword corresponding to the text screen's CLS that clears the graphics screen it should get rid of the stranded VDU28 for us.

Such a command is CLG. Try it and you'll be left with a nice blank screen. Not for long though. Let's draw a line across it with:

DRAW 1279,1823

No doubt we'd get a fortune for it at the Tate. However before you enter the tricky world of conceptualist art notice one thing about the line: It crosses the text window quite happily.

The text window is still there - we've only wiped it, not destroyed it. You'll see this is where we use CLS again.

Now the text screen is cleared and with it goes part of the white line, leaving it split in two. So clearing a text screen

```
10 REM Program I
20 MODE 1
30 VDU 23,1,0;0;0;0;
40 xleft=1:yleft=38
50 xright=38:yright=1
60 FOR loop1 TO 7
70 xleft=xleft+2:yleft=y
left-2
80 xright=xright-2:yright
t=yright+2
90 VDU 28,xleft,yleft,xr
ight,yright
100 COLDUR 128+loop MOD 4
110 CLS
120 NEXT loop
```

Program I

also gets rid of any graphics that cross it.

The text window is a bit of an elusive beast, isn't it? I mean we can't really see it, can we? This is because its background colour, black, is the same as the graphics screen's background colour. Let's change this with:

COLOUR 129

when a quick CLS will produce a nice red rectangle on screen. That's our text window. We can change the background colour of our graphics window, but this time we have to use GCOL.

It's used in exactly the same way as the COLOUR command with 128 added to the relevant logical colour number. So for a yellow graphics screen background we want GCOL along with 128+2. Try entering:

GCOL 0,138

which appears in the text window - and then clearing the graphics screen with CLG. The result is an almost completely yellow screen.

Notice that now the graphics screen has its revenge, totally swallowing the red of the text screen. All that's left is a forlorn white prompt on a red background at the top of the text screen area.

Give it some encouragement with a quick CLS which will cause the text area to reappear. You'll also see how much faster CLS is compared with CLG.

Try making your own text windows. Don't worry - if you make a mess of things you can always press Break. The more gentle among you may like to know that VDU 26 undoes the effect of VDU 28, setting things back to normal with the text and graphics screens filling the whole display.

Once you've got the hang of how to create text windows and the differences between them and the graphics screen have a look at Program I.

It produces a pattern by creating a text window and

clearing it, defining another window lying wholly inside the first and clearing that one to a different background colour and so on.

Line 30 switches off the flashing cursor while lines 40 and 50 initialise the variables that are used to define successive windows.

The FOR ... NEXT loop of lines 60 to 120 cycles seven times. Each time through, lines 70 and 80 calculate new values for the coordinates which are then used in line 90 to create a new text window. Line 100 picks a fresh background colour after which 110 clears it.

Text windows aren't limited to just making pretty patterns. They can help make displays easier to understand and add a professional touch. Program II shows a text window being used for a message while the rest of the screen is used for graphics.

The text window is set up at line 40. The program then enters an endless REPEAT ... UNTIL loop. Nested inside this is a FOR ... NEXT loop which cycles 50 times, drawing a multicoloured star in the process.

When this is done lines 110 and 120 use PRINT to send a message to the screen. This appears neatly in the text

```
10 REM Program II
20 MODE 1
30 VDU 23,1,0;0;0;0;
40 VDU 28,12,38,28,26
50 REPEAT
60 FOR loop1=1 TO 50
70 MOVE 640,612
80 GCOL 0, RND(3)
90 DRAW 640+(-1*RND(2))+RN
D(388),612+(-1*RND(2))+RN
D(388)
100 NEXT loop
110 PRINT "Press spacebar"
120 PRINT"for another go"
130 wait=GET
140 CLS
150 UNTIL FALSE
```

Program II

window under the display. Try moving the window to another area of the screen and see what happens.

You'll find that line 40 is the only one that needs altering. The program now waits until a key is pressed, then clears the text window and carries on. Add:

145 CLB

and see what happens. Do you need line 140 now?

As you've played around with text windows you've probably noticed that they are a great way of producing coloured rectangles on screen. Program III makes use of this to produce five randomly positioned blocks of colour.

The mechanics of the pro-

```
10 REM Program III
20 ONERROR GOTO 130
30 MODE 1
40 VDU 23,1,0;0;0;0;
50 FOR loop1=1 TO 5
60 COLOUR 128+RND(3)
70 leftx=RND(38)
80 topy=RND(38)
90 VDU 28,1,0;0;0;
100 GCOL 0, RND(3)
110 CLS
111 NEXT loop
120 REPEAT UNTIL FALSE
130 COLOUR 3:COLOUR 128:V
DU 26:CLS
```

Program III

gram should be fairly straightforward by now. All line 20 does is make sure that when you press Escape to stop the program the screen reverts to normal. It's much subtler than hammering the Break key, isn't it?

One thing about Program III is that the loop cycles five times, but you don't always see five rectangles. Can you explain why? And can you solve the problem?

● By the time you've done that you'll really understand text windows and be ready for next month when we'll look into some more windows.

Maze listing

From Page 31

```

438 LDAcou:CMPTime1:BPLsa      888 LDAxenem:CMPxenemay
vel                                898 BEQnenemay
10 REM Maze                         908 BMienleft
28 REM By S.Merrigan                918 BPLenright
30 REM (c) Electron User             928 .neway1
48 DNERRORMODE6:REPORT:P           938 LDAYmen:CMPyenemay
RINT" at line "1;ERL:END          948 BEQnenemay2
58 IFPAGE%>E08 PROCload         958 BMienup
:END                                968 BPLendown
68 MODE4:PROCins:CLS               978 .neway2
70 REPEAT                           988 LDAXenem:CMPxtople:B
88 ?keyco=1?keyco?1=0?:1          528 .time1 EQUW0:EQUW0:EQ
eave@0:mazeyI@?:=map@:scI@      UBB
@:li1=3:7%6&6:7%8?5              538 .so EQUW1:EQUW1:EQUW2
98 PROCvar:PROCread:PROC        8:EQUW10
key:PROCre_spr1                   548 .so1 EQUW1:EQUW2:EQUW
108 REPEAT:MODES                  108:EQUW10
110 VDU19,0,4;8;                 558 .so2 EQUW1:EQUW3:EQUW
128 VDU23,1,0;8;8;8;             108:EQUW2
130 PROCDraw:PROCre_spr:C       568 .so3 EQUW1:EQUW2:EQUW
ALLmaze                            108:EQUW1
140 CALLstart                      578 .say3
158 IF?dead=2 MODE4:PROCd        588 CMP#0:BEQnenemay:JMPene
reasp                               my2
168 IF?dead=3 PROClivel:P        598 .snupl
ROCvar:PROCread:PROCkey:key     608 LDA#0:STA(enem ypos),Y
co?1@?leave@?:=map@              618 LDA#7:STA(enem ypos
178 IF?dead=1 PROClive:PR        628 LDA#7:STA(enem ypos)+1
OCvar                             638 LDA#2:STA(enem ypos),Y
188 UNTILii?X=0                  648 DECenemem:JMPenemay2
198 scI=scI?(keyco?1=10)          658 .snup
208 VDU20:CLS:IF scI?HIX(        668 LDA#0:STA(enem ypos),Y
5) PROChi                          678 LDA#7:STA(enem ypos)+1:STA#71
218 PROChi_sc                     688 LDA#7:SEC:SBC#21:STA
228 UNTILFALSE                    178
238 DEFPROCcasable               698 LDA#7:1:SBC#0:STA#71
248 FOR1=BT02STEP2                708 LDY#0:LDA#78,Y
258 PI=PQ                         718 CMP#0:BNEmay3:LDA#1:S
268 IOPTI                           TAded:JMPenupl
278 .start                          728 .endown
288 LDA#87:STAem                  738 LDAnememypos:STA#78
298 .start1                         748 LDAnememypos+1:STA#71
308 JSRmove                         758 LDA#7:CLC:ADC#21:STA
318 LDA#86:STAcou:JSRsave        178
328 LDAdead:BEQstart2:RTS         768 LDA#71:ADC#0:STA#71
338 .start2                         778 LDY#0:LDA#78,Y
348 DECem                          788 CMP#0:BNEmay4:LDA#1:S
358 BPLstart1                      TAded:JMPendownl
368 LDX#so3 M0D256:LDY#so        798 .say4
3 DIV256:LDA#7:JSR&FFF1            808 CMP#0:BEQendown1:JMPe
378 JSRnenemay                    neway2
388 JNPstart                        818 .endown1
398 .save                           828 LDA#0:STA(enem ypos),Y
408 LDA#2:LDX#time M0D256        838 LDA#7:STA(enem ypos
:LDY#time DIV256:JSR&FFF1          848 LDA#71:STA(enem ypos)+1
418 .save1                          858 LDA#2:STA(enem ypos),Y
428 LDA#1:LDX#time1 M0D25       868 INCenemem:JMPenemay2
6:LDY#time1 DIV256:JSR&FFF1        878 .enemy

```

```

1918 .eraser
1920 STA@&72,Y
1938 DEY
1940 BNEeraser
1958 LDA@&72:CLC:ADC#&48:STA
A&72
1968 LDA@&73:ADC#1:STA@&73
1978 LDY#144:LDA#0
1988 DEX:BPLeraser
1990 RTS
2000 .an
2018 LDA#&30:STA@72
2028 LDA#&BC:STA@73
2038 LDX#4:LDY#31
2048 .an1
2058 LDA@&72,Y
2068 EOR#78,Y
2078 STA@&78,Y
2088 DEY:BPLman1
2098 LDA@&72:CLC:ADC#32:STA
A&72
2108 LDA@&71:ADC#1:STA@71
2128 LDY#31:DEX:BPLman1
2138 RTS
2148 .keyhole
2158 LDX#2:LDA#&0:STA@72
2168 LDA#&BC:STA@73
2178 .key1
2188 LDY#15
2198 LDA@&72:CLC:ADC#&48:STA
A&78
2208 LDA@&71:ADC#1:STA@71
2218 .key2
2228 LDA@&72,Y
2238 EOR#78,Y
2248 STA@&78,Y
2258 DEY:BPLkey2
2268 LDA@&72:CLC:ADC#16:STA
A&72
2278 DEX:BPLkey1
2288 RTS
2298 .key LDX#2:LDA#&14:STA
A&72
2308 LDA#&09:STA@73
2318 .keys LDY#31
2328 .keys1
2338 LDA@&72,Y
2348 EOR#78,Y
2358 STA@&78,Y:DEY:BPLkey
s1
2368 LDA@&72:CLC:ADC#32:STA
A&72
2378 LDA@&78:ADC#&48:STA@&78
2388 LDA@&71:ADC#1:STA@71
2398 DEX:BPLkeys:RTS
2408 .move LDA@1:STA@&4

```

Maze Man



Score -0
Keys -0:2
Lives -3

MAP

```

2418 LDA#129:LDY#&FF:LDX#6
9E:JSR#FFF4:CPY#0:BEQmove2:
JMPleft
2428 .move2 LDA#129:LDY#&F
F:LDX#&0:JSR#FFF4:CPY#0:BE
Qmove3:JSRright
2438 .move3 LDA#129:LDY#&F
F:LDX#&7:JSR#FFF4:CPY#0:BE
Qmove4:JMPup
2448 .move4 LDA#129:LDY#&F
F:LDX#&7:JSR#FFF4:CPY#0:BE
Qmove5:JSRdown
2458 .move5 LDAnap:CPM#1:B
NEmove6:LDA#129:LDY#&FF:LDX
#&9D:JSR#FFF4:CPY#0:BEQmove
6:LDA#2:STAdead
2468 .move6 DEC#4:BEQmove
7:RTS
2478 .move7 LDA#6:STAcouJ
MPSave
2488 .left LDAnap:STA@7
8
2498 LDAnap:STA@71
2508 LDA@&78:SEC:SBCH#1:STA
78
2518 LDA@71:ADC#8:STA@71
2528 LDY#0:LDA@&78,Y
2538 BEQleft1:CPM#5:BNEnedi
:LDAlleave:CPM#1:BNEnedi:L
D403:STAdead:JMPright1
2548 .ned1 CMP#4:BNEgo:JS
Reaps1:JMPright1
2558 .go CMP#3:BEGgot:JMPa
ove3
2568 .got JSRkey:LDY#0
2578 .left1 INC#84
2588 DECxman:DECxtople:DEC
xbotri
2598 LDA#0:STA(manpos),Y
2608 LDAnap:SEC:SBCH#1:S
TAnapos
2618 LDAnap:SEC:SBCH#0:STA
manpos+1
2628 LDAnap:SEC:SBCH#1:
STApinter
2638 LDAnap:SEC:SBCH#0:ST
Apinter+1
2648 LDA#2:STA(manpos),Y
2658 JSRvduoff:JSRerase:JS
Pmaze
2668 .right LDAnap:STA@7
2678 LDAnap:STA@71:STA@7
2688 LDY#0:LDA@&78,Y
2698 LDY#0:LDA@&78,Y
2708 LDY#0:LDA@&78,Y
2718 BEQright1:CPM#5:BNEne
di:LDAlleave:CPM#1:BNEnedi:L
D403:STAdead:JMPright1
2728 .ned1 CMP#4:BNEgo:JS
Reaps1:JMPright1
2738 .go1 CMP#3:BEGgot:2:RT
S
2748 .got2 JSRkey:LDY#0
2758 .right1 INC#84
2768 INCxman:INCxtople:INC
xbotri
2778 LDA#0:STA(manpos),Y
2788 LDAnap:SEC:SBCH#1:S
TAnapos
2798 LDAnap:SEC:SBCH#0:STA
manpos+1
2808 LDApinter:CLC:ADC#1:
STApinter
2818 LDApinter+1:ADC#0:ST
Apinter+1
2828 LDA#2:STA(manpos),Y
2838 JSRvduoff:JSRerase:JS
Pmaze
2848 .up LDAnap:STA@78
2858 LDAnap:STA@71:STA@7
2868 LDAnap:STA@71:STA@7
2878 LDA@71:SBCH#0:STA@71
2888 LDY#0:LDA@&78,Y
2898 BEQup1
2908 CMP#5:BNEnedi:2:LDAleav
e:CPM#1:BNEnedi:2:LDA#3:STAde
ad:JMPup1
2918 .ned2 CMP#4:BNEgo:JS
Reaps1:JMPright1

```

Maze listing

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Reaps:JMPup1
 2928 .go2 CMP#3:BEGot3:JM
 Peov5
 2930 .got3 JSRkey:LDY#0
 2948 .up1 INC#84
 2950 DECyman:DECytopic:DEC
 ybotri
 2960 LDA#0:STA(manpos),Y
 2978 LDAmanpos:SEC:SBC#21:
 STAmanpos
 2980 LDAmanpos+1:SBC#0:STA
 manpos+1
 2998 LDApointer:SEC:SBC#21
 :STApinter
 3000 LDAtointer+1:SBC#0:ST
 Apinter+1
 3010 LDA#2:STA(manpos),Y
 3028 JSRVduoff:JSRerase:JS
 Reaze:JMPmave5
 3030 .down LDAmanpos:STA#7
 0
 3040 LDAmanpos+1:STM#7
 3050 LDA#7:CLC:ADC#21:STA
 &78
 3060 LDA#7:ADC#0:STA#71
 3078 LDY#8:LDA(&78),Y
 3080 BEldown1
 3098 CMP#5:BNEned3:LDAleav
 e:CMPI#1:BNEned3:LDA#3:STAde
 ad:JMPdown1
 3100 .ned3 CMP#4:BNEgo3:JS
 Rmapso:JMPdown1
 3110 .go3 CMP#3:BEGot4:R
 TS
 3120 .got4 JSRkey:LDY#0
 3130 .down1 INC#84
 3140 INCyman:INCytopic:INC
 ybotri
 3150 LDA#0:STA(manpos),Y
 3160 LDAmanpos:CLC:ADC#21:
 STAmanpos
 3170 LDAmanpos+1:ADC#0:STA
 manpos+1
 3180 LDApointer:CLC:ADC#21
 :STApinter
 3190 LDApointer+1:ADC#0:ST
 Apinter+1
 3200 LDA#2:STA(manpos),Y
 3210 JSRVduoff:JSRerase:JM
 Pmaze
 3220 .maze LDApointer:STA#
 78
 3230 LDApointer+1:STA#79
 3240 LDA#2:STAcounter
 3250 LDA#0:STAcounter+1
 3260 LDA#6:STAcounter+2

3270 .maze4 LDA#0:1:STAcount
 er+3:JSRmazel
 3280 LDA#7:CLC:ADC#21:STA
 &78
 3290 LDA#79:ADC#0:STA#79
 3300 DECcounter:BPLmaze4:L
 DY#3
 3310 .vdun LDA#19:JSRo
 3320 TYA:JSRo:JSRo
 3330 LDA#0:JSRo:JSRo:JSRo
 3340 DEY:BNEvdun
 3350 JMPline
 3360 .mazel LDYcounter+3:L
 DA(&78),Y
 3370 BEGmazeo
 3380 LDYcounter+1
 3390 LDIX#988,Y:STX#78
 3400 LDIX#981,Y:STX#71
 3410 CMPI#1:BNEmazel3:JSRbox
 :JMPmazeo
 3420 .maze3 CMP#2:BNEmazel2
 :JSRmazel
 3430 .maze2 CMP#3:BNEmazel1
 SREKEY:JMPmazeo
 3440 .mac CMP#4:BNEmazel1:
 SRdr:JMPmazeo
 3450 .mazie CMP#5:BNEmazel0
 :JSRkeyhole
 3460 .mazeo INCcounter+3
 3470 INCcounter+1:INCcount
 er+1
 3480 LDAcounter+1:CMPCount
 er+2
 3490 BNEmazel
 .5500 LDAcounter+2:CLC:ADC
 #6:STAcounter+2
 3510 RTS
 3520 .vdouff LDY#3
 3530 .vdouff1 LDA#19:JSRo
 3540 TYA:JSRo
 3550 LDA#4:JSRo
 3560 LDA#0:JSRo:JSRo:JSRo
 3570 DEY:BNEvdouff1:RTS
 3580 .line LDA#25:JSRo:LDA
 #4:JSRo
 3590 LDA#249:JSRo:LDA#0:JS
 Ro
 3600 LDA#96:JSRo:LDA#2:JSR
 o
 3610 LDA#25:JSRo:LDA#5:JSR
 o
 3620 LDA#184:JSRo:LDA#1:JS
 Ro
 3630 LDA#192:JSRo:LDA#2:JS
 Ro
 3640 LDA#25:JSRo:LDA#4:JSR
 o
 3650 LDA#128:JSRo:LDA#2:JS

Ro
 3660 LDA#228:JSRo:LDA#1:JS
 Ro
 3670 LDA#25:JSRo:LDA#5:JSR
 o
 3680 LDA#64:JSRo:LDA#3:JSR
 o
 3690 LDA#64:JSRo:LDA#2:JMP
 o
 3700 .erkey INCkeyco+1
 3710 LDAkeyco+1:CMPCkeyco+8
 NEerkey:LD#0:1:STAleave
 3720 .erkey1 LDA#0:1:JSRo:L
 DA#12:JSRo:LDA#23:JSRo
 3730 LDAkeyco+1:CLC:ADC#48
 :JSRo
 3740 LD#0:so MOD256:LDY#so
 DIV256:LDA#7:JMP&FF1
 3750 .dr_map LDA#0:9:STA#7
 3
 3760 LDA#74:STA#72
 ,28802A,232FF2,28802A,2
 BEBEA,382AWE,382A86,263E
 32,2F#07A,2F5367A,266332,
 38F786,3FFF
 3790 LDA#71:ADC#1:STA#71
 3800 .dr_map1 LDA(&72),Y
 3810 EDR(&78),Y
 3820 STA(&78),Y
 3830 DEY:BPLdr_map1
 3840 LDA#72:CLC:ADC#32:STA
 &72
 3850 LDA#78:ADC#48:STA#78
 3860 LDA#71:ADC#1:STA#71
 3870 LDY#3:DEY:BPLdr_map1
 :RTS
 3880 .mapso LDA#38:STA#78
 3890 LDA#7A:STA#71
 3900 JSRdr_map:LDA#1:STA#
 p
 3910 LDIX#o1 MOD256:LDY#so
 1 DIV256:LDA#7:JSR&FFF1:LDY
 #:RTS
 3920 J:NEXT:ENDPROC
 3930 DEFPROCdraw
 3940 GCOL#3,FORI#1=TO24ST
 EPB
 3950 JI=II/2
 3960 MOVE16+II,B+JI:DRAW12
 63-JX,B+JX:DRAW1279-II,B+JX
 :DRAW1279-II,1815-JI:DRAW12
 63-II,1823-JI:DRAW16-II,182
 3-JI:DRAW#18,1815-JI:DRAW8
 +II,B+JX:DRAW16-II,B+JX
 3970 NEXT
 3980 GCOL#1,MOVE248,6#8
 3990 DRAW248,474:DRAW632,4
 76
 4000 DRAW832,576:DRAW832,7

84
 4010 DRAW448,704:DRAW248,6
 88
 4020 COLOUR3
 4030 PROCa(5,23,"Keys -")
 :PRINTTAB(12,23);keyco?;"
>"?keyco
 4040 PROCa(5,21,"Score -")
 4050 PRINTTAB(12,21);scI
 4060 PROCa(5,25,"Lives -")
 4070 PRINTTAB(12,25);lI
 4080 PRINTTAB(6,3);PROCb
 ("Maze Man")
 4090 PROCa(6,5,"---- ----")
 :GCOL#8,1
 4100 IF?map=1 CALLmapso
 4110 ENDPROC
 4120 DATA#3FFF,4&07F86,&
 266332,&2F5367A,&2F887A,2463
 E32,&382AWE,382A86,&2BEBE
 ,38802A,232FF2,28802A,2
 BEBEA,382AWE,382A86,263E
 32,&2F#07A,2F5367A,266332,
 38F786,3FFF
 4130 DATA#3FFF,4&288002,&
 2FF7FA,&28148A,&2BC1AA,&2BF
 FA,&2B88BA,&2AEFAE,&2A42A
 ,&2B5AA,&2252A2,&2ADEA,&
 A48AA,&2B7FAA,&2B121A,&2BC4
 6A,&2BFFEA,&2B8800A,&2FF7FA,
 &288002,3FFF
 4140 DATA#3FFF,4&288002,&
 2D5B8A,&25498A,&2D593A,&25C
 922,&249822,&2C993A,&288002
 ,&2FFFA,&22288A,&2A880A,&
 2280A,&2A88AA,&2A88AA,&2A88AA,
 &22288A2,&3FFF
 4150 DEFPROCread
 4160 RESTORE(4128+maze%)
 4170 FORI#0:T020:READAI:F0
 RJ#1=T021:A#1=XIDIV2:?(&maze
 +1)*21+JI)=XINDD2:NEXT,
 4180 RESTORE4218
 4190 FORII#0:T017:READAI:II
 ?X=A:NEXT
 4200 ENDPROC
 4210 DATA#8E,64,88,88,65,&
 28,&65,&10,66,&30,66,65,&
 66,64,67,66,66,67,68,67
 4220 DATA#15,15,15,15,15,15,
 12,8,15,14,12,8,8,8,8
 4230 DATA#255,255,255,255,2
 39,287,143,15,239,287,143,
 5,15,15,15,15
 4240 DATA#8,8,8,8,17,51,119,
 255,17,51,119,255,255,255,
 255,255



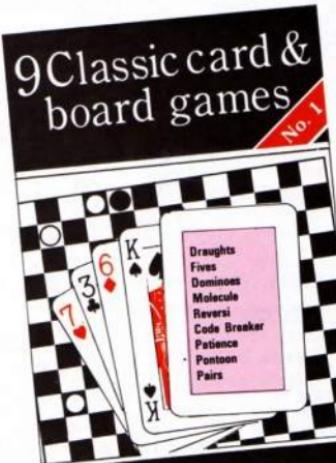
4258 DATA0,8,8,8,8,8,8,8,8,
8,8,8,8,8,17,51,8,8,8,8,8,
8,238,236,8,8,8,8,8,8,8,
4268 DATA0,8,8,8,8,8,8,8,8,
7,39,7,22,3,183,15,62,30,9
4,38,158,63,127,15,128,128,
128,128,8,136,298,192
4270 DATA16,1,33,3,67,22,
22,22,15,15,15,75,195,131,1
31,1,31,15,15,45,68,68,68,
8,192,72,184,44,68,22,22
4280 DATA0,8,8,8,8,17,17,1,
3,67,7,7,143,158,68,68,61,6
2,38,38,38,23,3,3,8,8,8,8,2
408,268,72,72
4298 DATA0,8,8,8,8,16,3,3,
68,68,68,68,68,68,44,3,3
3,3,3,3,3,192,192,192,192,
2,192,224,44,44
4308 DEFPROCrc_spr
4310 RESTORE4220
4320 FORIT:#T0255:READX:I
I#T0C08=A1NEXT
4338 ENDPROC
4348 DEFPROCrc_spr1
4350 RESTORE4446
4368 FORIT:#T0159:READX:I
I#T914=A1:NEXT
4378 ENDPROC
4380 DATA51,183,71,71,71,7
1,183,51
4398 DATA238,63,31,31,31,3
1,63,118
4408 DATA17,17,17,17,17,17
58,58
4418 DATA76,76,196,196,196
196,226,226
4428 DATA58,58,58,116,116,
116,116,51
4438 DATA226,226,226,241,2
41,241,241,238
4448 DATA0,8,8,8,8,8,8,8
4458 DATA0,8,8,8,8,8,8,8
4468 DATA0,8,8,8,8,8,8,8
4478 DATA0,8,8,8,2,7,38
4488 DATA0,8,3,22,118,118,1
83,127,255
4498 DATA0,8,6,12,237,253,
223,255
4508 DATA1,17,17,29,89,219
159,255
4518 DATA188,252,244,244,2
44,244,244,24
4528 DATA255,255,119,8,8,8
8,8
4538 DATA255,255,255,8,8,8
8,8
4548 DATA255,255,255,17,17

```

17,17,8
4558 DATA244,244,244,244,2
44,188,284,136
5456 DEFPROCkeyco:IF?keyco<
?keyco=?keyco+1
4578 maze?224=2:maze?212=
2
4580 IFmazeY?8=maze?158=
5 ELSE maze?208=5
4598 FORI?1=1TO?keyco
4600 XI=RND(448)
4602 IFmaze?27XK@ B0T0468
8 ELSE maze?1XX?3
4628 NEIT
4630 XI=RND(448)
4648 IFmaze?27XK@ B0T0463
8 ELSE maze?1XX?4
4658 ENDPROC
4668 DEFPROCDrammap:SOUND1,1
,188,18
4678 VDU19,1,4;8;8;8;VDU1
9,8,3;8;8;8
4688 VDU23,224,8,8,8,8,8,8,8
,8,8
4698 VDU23,225,255,255,255
,255,255,255,255,255
4708 VDU23,226,24,68,24,12
,6,153,36,36,36
4718 VDU23,227,8,2,5,253,1
65,2,8,8
4728 VDU23,229,24,68,68,24
,68,68,126,126
4738 VDU28,8,31,28,4
4748 FORI?8=1TOmaze?+
4751;VDU22+?1;NEIT
4750 ?dead=@:PRINT''TAB(5)
;PRESS SPACE:REPEATUNTIL
NKEY?99:ENDPROC
4768 DATA8,8,8,16,48,97,

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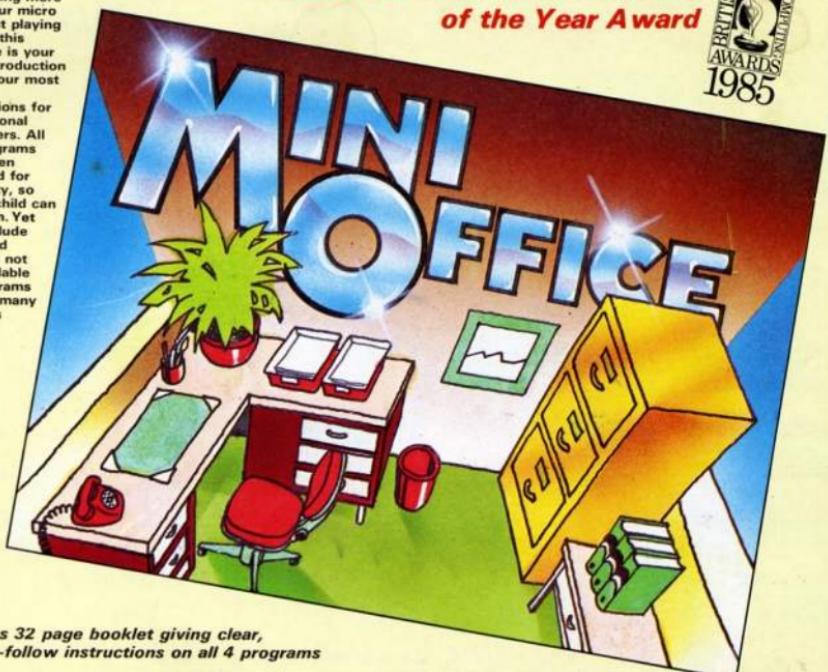
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